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SOUTH PACIFIC COMMISSION

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VOL. 3. NO. 3 JULY, 1953

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PUBLISHED BY THE SOUTH PACIFIC COMMISSION, NOUMEA, NEW CALEDONIA

THE SOUTH PACIFIC COMMISSION

The South Pacific Commission is an advisory and consultative body set up by the six Governments responsible for the administration of Island Territories in the South Pacific region. Its purpose is to recommend to the member Governments means for promoting the well-being of the people of these territories. It is concerned with social, economic and health matters. Its headquarters are at Noumea, New Caledonia.

The Commission was established by an Agreement between the Governments of Australia, France, the Netherlands, New Zealand, the United Kingdom and the United States of America, signed at Canberra on the 6th February, 1947, and finally ratified on the 29th July, 1948. Until the 7th November, 1951, the area of the Commission's activities comprised territories lying generally south of the equator from and including Netherlands New Guinea in the west to the French Establishments in Oceania and Pitcairn in the east. On 7th November, 1951, an additional Agreement was signed at Commission headquarters in Noumea on behalf of the six participating Governments, extending the scope of the Commission to include Guam and the Trust Territory of the Pacific Islands under United States administration.

The Commission consists of twelve Commissioners, two from each Government, and meets twice a year. The first Session was held in May, 1948. There are two auxiliary bodies, the Research Council and the South Pacific Conference.

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The Research Council also meets twice a year and held its first meeting in May, 1949. Members are appointed by the Commission, and are selected for their special knowledge of the questions with which the Commission is concerned, and the problems of the territories in these fields. The chief function of the Research Council is to advise the Commission what investigations are necessary. Arrangements to carry out those that are approved are the responsibility of the Secretary-General and other principal officers.

The South Pacific Conference, which meets at intervals not exceeding three years, consists of delegates from the local inhabitants of the territories, who may be accompanied by advisers. The first Conference was held in Suva in April, 1950, and was attended by delegates from fifteen territories and from the Kingdom of Tonga. The second Conference was held at Commission headquarters in April, 1953.

The Commission's staff includes six principal officers, as follows: Secretary-General, Sir Brian Freeston, K.C.M.G., O.B.E. (United Kingdom); Deputy Chairman of the Research Council, Dr. E. M. Ojala (New Zealand); Deputy Secretary-General, Mr. John Ryan (Australia); Executive Officer for Health, Dr. E. Massal (France); Executive Officer for Economic Development, Dr. A. H. J. Kroon (Netherlands); Executive Officer for Social Development, Mr. H. E. Maude, O.B.E. (United Kingdom). The Deputy Chairman and the three Executive Officers are ex officio members of the Research Council. The principal officers are supported by a small technical and administrative staff.

Further particulars of the Commission's activities may be obtained from the Secretary-General, Noumea, New Caledonia.

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THE SPC QUARTERLY BULLETIN, first published in January, 1951, was instituted primarily to provide, for general circulation, a quarterly survey of the Commission's activities in its three main fields of operation; economic development, health and social development. Articles are also featured on a wide variety of subjects in these and related fields, usually contributed by specialists working in the territories within the Commission area.

THE BULLETIN is given selective world distribution to people and institutions in widely differing fields sharing a common interest in the purposes and work of the Commission. It is published in two editions, English and French.

ALL ENQUIRIES relating to the SPC QUARTERLY BULLETIN, together with subscriptions and orders for single copies, should be directed to the Secretary-General, South Pacific Commission, Noumea, New Caledonia.

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Rhinoceros Beetle Quarantine and Control Problems

The recently-discovered rhinoceros beetle infestation in Fiji has focussed attention on the gradual spread of this pest in the Pacific since it was first found in Western Samoa in 1910. This article reviews present distribution of the beetle in the Far East and the Pacific, and describes the eradication campaign now in progress in the infested areas on Viti Levu. Recommended quarantine and control measures applicable in all Pacific territories are outlined and a brief survey is given of a research project intended to increase their efficiency. This project is now being carried out by the South Pacific Commission.

By L. J. DUMBLETON

Plant and Animal Quarantine Officer,
South Pacific Commission

A coconut plantation infested with rhinoceros beetle. The "V" shaped notches in the fronds reveal the presence of the adult beetle.

THE present distribution of *Oryctes rhinoceros* is fairly extensive in the Far East and the Pacific. The insect occurs in Ceylon, India, Indo-China, South China, Formosa, Malay Archipelago as far as Ceram, Philippines, Palau Islands, New Britain, New Ireland, Western Samoa, American Samoa, Wallis Islands, Vavau Island (Tonga Group), Viti Levu (Fiji). Several other species of the same genus occur in East Africa.

The beetle has been in Samoa since 1910, in Wallis Island since 1930, in the Palau Islands and in New Britain and New Ireland since 1942, in Vavau since 1952, and in Viti Levu since 1953.

In Vavau an eradication campaign has been in progress for a year, and the numbers of the beetle have been reduced to a low level. The beetle was established in an area around (and including) Neiafou, the port of the island.

In Fiji the beetle is present on the south coast of the island of Viti Levu. Beetles or larvae have been found within a narrow area 30-40 miles long between the Rewa river on the east of Suva and a point about 10 miles west of the Navua river on the west of Suva. About 53 adults and 640 larvae and pupae have been collected and destroyed. Most of this area along the Queen's Road to the west of Suva extends only one or two miles inland from the coast. The points nearest to the wharf are Lami, one mile distant, and the cemetery, which is less than a mile away. No stage of the beetle has been found in the immediate vicinity of the wharf or in the town area proper.

Evidence of beetle damage to palms has been found over a wider area, including points east of the Rewa river and points on the Navua and Waindina rivers about 15 miles inland from the coast.

A survey and eradication campaign employing 200 men is in progress. In view of the large area of infestation, however, it is not now considered practicable to attempt the elimination of all potential breeding places, which was one of the aims of the original eradication campaign.

In the Palau Islands an endeavour has been made to eradicate the beetle from Malakai, the sea terminus of the Palaus, and it has been made illegal to grow any palms or pandanus there.

In both Western Samoa and American Samoa regulations exist requiring the inhabitants to collect and destroy *Oryctes*, but the port areas, Apia and Pago Pago, cannot be regarded as free of the insect. In the Rabaul (New Britain) area the beetle must also be regarded as virtually uncontrolled.

Habits of the Beetle in Relation to Quarantine

The immature stages of the beetle are found in rotting coconut logs or the dead trunks of other palms, in rotting hardwood logs, in compost heaps, and sawdust, and in dead pandanus. It is not known to breed in coconut husks.

The damage to the palm is done by the beetle, which bores into the crown for the purpose of feeding. This injury may damage the growing point of the palm and result in its death.

The beetle flies only after dark. It may fly in the early morning before sunrise as well as in the period from 8-9 p.m., to which most of the flight records refer.

The distance which the beetle is able to fly is not accurately known. One estimate of 200 yards is given but it is probably able to exceed this. Another estimate of the flight range is $\frac{5}{8}$ mile.

Some beetles are attracted to light, but they have never been observed to come to light in large numbers. The attractiveness of different kinds and intensities of light is not known.

The beetle has never been recorded as being attracted to or as feeding on or breeding in copra.

The adult beetles bore into the crowns of palms and may remain there a week or more for the purpose of feeding on the plant juices. They are known to feed on many different kinds of palms, but there is some evidence that they prefer coconut. Apart from feeding on palms they are known to feed on *Pandanus* and occasionally on sugar cane. It is probable that these food plants are not preferred but will be utilized if the preferred food plants such as palms are not available.

Little information exists on this. The fact that Fiji traded with Samoa for 43 years before the beetle became established in Fiji suggests that the transference of the insect is a chance and rather infrequent occurrence.

It is considered that the chances of the immature stages (eggs, *larvae* and *pupae*) of the beetle being transported are not great, if only because the materials in which they are commonly found are unlikely to be shipped from place to place. The exception is in the case of soil, and especially soil of high humus or organic matter content, which might be transported around the roots of plants.

It is probable that the greatest risk is of the transference of adult female beetles. These are known to be robust, and to have a duration of life of two or three months.

The beetle is not known to be constantly associated with any plant material or agricultural produce which is commonly shipped. It is probably therefore a chance stowaway on vessels. The beetle could be carried into the hold of the vessel on any packages on or in which it had sought shelter with the coming of daylight. It could be attracted by the lights used on the ship and fall into the hold when holds are worked at night. It could alight and take shelter in recesses in the ship's superstructure, whether by chance or by attraction to lights.

The cases of beetles actually having been found on ships are too few in number to allow an estimate of the relative frequency of travel on the superstructure and in the ship's hold.

Cases are known of beetles having been found in dwellings. The risk of transportation of the beetle in personal belongings is probably greatest in the case of native peoples. These may come from a village where *Oryctes* is abundant and beetles may have sought shelter in rolls of mats, etc.

Quarantine Measures

Probably the most valuable single measure which could be taken would be the eradication of the beetles in the areas surrounding the ports of the interested countries. If eradication is not possible, every effort should be made to keep the numbers of the beetles at as low a level as possible.

Port of Departure: Unless the beetle has been eradicated or virtually eradicated surrounding the port of departure, consideration should be given to the following requirements:—

(1) The ship to move offshore at night, preferably one mile. If holds are worked while lying offshore, bright lights should be shielded on the shore side.

(2) Inspection of holds prior to departure.

(3) Inspection of passenger's baggage prior to departure.

Port of Arrival: In the port of arrival, the following precautions can be taken:—

(1) All materials such as soil, compost, rotting palmwood or hardwood sawdust or other organic materials capable of containing eggs and larvae of the beetle should be prohibited entry.

(2) All holds loaded in an infested port to remain closed—or such holds to be worked only during the day.

(3) The ship to be preferably one mile offshore at night.

(4) Inspection of superstructure and hold on arrival.

(5) Inspection of passenger's baggage.

Periodic surveys of the port and adjacent areas should be made. In making these surveys, the following evidence should be looked for:—

(1) The actual presence of any stage of *Oryctes rhinoceros* in potential breeding places. (Rotting coconut logs, compost heaps, sawdust piles, etc.)

(2) The characteristic notching of the palm fronds due to damage by adult insects, or evidence of boring in the crowns.

It may also be advisable to place split coconut logs on the ground in selected locations around the port, and to examine these at regular intervals for the presence of beetles or larvae.

Wide publicity should be given, by means of posters and specimens of the insect, to the appearance and habits of the beetle. The public should be encouraged to report and bring in to the Agriculture Department specimens of any insect which they suspect to be the Rhinoceros beetle.

In territories at present not infested by the beetle, the use of a poster drawing attention to the danger and facilitating the recognition of the insect will increase the chances of any new establishment of the beetle being promptly reported while the infestation is still capable of eradication. The Commission is exploring the possibility of assisting territories with the provision of such a poster.

The question of removal of living palms around the port area is debate-

able. The object would be to deny the beetle its preferred food plants. However, unless all potential breeding places in the area were removed at the same time, the beetle could still establish itself. Furthermore, it might be of more value to retain the palms, since it is by the observation of damage to palms that the presence of the beetle may be first ascertained.

Control Measures

Control measures consist in:—(a) plantation hygiene, i.e., the elimination of all materials in which the beetle can breed; (b) collection and destruction of all stages of the beetle from natural breeding places; and (c) the use of log traps to which the beetles are attracted and from which they are periodically collected. These should be placed where they can be readily re-located. If the necessity for their use ceases or if it is not possible to examine them regularly they should be removed; otherwise they constitute an additional breeding place.

No parasite, predator or disease has so far proved to be effective. Only one parasite is known to be successfully established (i.e., *Scolia ruficornis* in Western Samoa), and it has not so far given evidence of being able to control the beetle to any marked degree.

Future Research

The Commission, recognizing that the problem of controlling the beetle in the territories where it exists and preventing its spread to other uninfested territories is a matter of concern to all its member nations, recently formulated proposals for research which aims at increasing the efficiency of both control and quarantine measures.

At its Eleventh Session in April, 1953, the Commission approved the project and directed the Secretary-General to proceed with its implementation. In June, the proposals were submitted to the Research Council, which approved the technical aspects. The financing of the project is to be considered by the Commission in October, 1953. The early approval given to the project was the result of very generous offer by the Fiji Government to guarantee the funds (up to £Stg.10,000) required for the operation of the scheme in the first year. Western Samoa has also indicated its willingness to contribute to the cost of the scheme.

The Commission has already made widespread enquiries for two entomologists. One of these will be engaged in a search for parasites, predators or other organisms which may be of use in controlling the beetle. The other will be engaged on research into the life history and habits of the beetle in order to provide a sound basis for control and quarantine measures. As soon as preliminary enquiries have been made it is proposed to appoint a chemist who will work on the development of chemical atractants which could be used as a valuable auxiliary weapon in survey and eradication work and in control operations.

Kenaf Experimentation in Papua and New Guinea

KENAF (*Hibiscus cannabinus* L.) is an annual or semi-perennial fibre plant found distributed throughout the world in the tropics and subtropics. It is thought to have originated in Northern India.

It has a bast fibre which falls into the long soft group similar to jute and capable of use in the same way as jute in the manufacture of yarns, cordage, hessian, sacking, carpet backing, and so on.

The first introduction of kenaf to Papua and New Guinea was made in December, 1950, from Cuba, following a visit there by an officer of the Department of Agriculture.

Previously work had been done with allied crops, such as Roselle (*Hibiscus sabdariffa*).

Early tests with kenaf indicated that the crop would thrive, and a major programme of introduction and environmental testing and mechanization trials was instituted with the approval of the Commonwealth Government. About three tons of seed were introduced from Cuba in each of the years 1951-52, 1952-53, these being of the salvadore variety, with which the early tests were carried out.

In addition, a range of varieties has been introduced from Asia and Africa.

Kenaf is subject to photoperiodism; i.e., it is physiologically affected by the hours of daylight at any particular time of the year, and it was first thought by various workers that Papua and New Guinea would be too close to the Equator for the production of satisfactory fibre crops. However, investigations have shown that there is a cropping season lasting from very early September to late April wherever the rainfall is satisfactory. Work is being done with other varieties, such as the Javanese variety developed in Cuba, which is said to show resistance to photoperiodism, with a view to further lengthening this period.

Full Mechanization Possible

Research indicates that the production of kenaf fibre can be totally mechanized, including the extraction of fibre from the plant. Successful tests with a reaper and binder for harvesting fibre crops have just been completed, while work is still proceeding with the adaptation of grain headers to harvest the seed crops.

Resulting from the efforts of Mr. R. A. Colyer, of Colyer Watson Ltd., satisfactory wool-packs have been made in Australia and New Zealand from kenaf fibre produced in Papua and New Guinea.

First exports of kenaf fibre from the territory were made in 1952.

Economic Stock-taking of Western Samoa

An economic stock-taking of Western Samoa is being carried out for the South Pacific Commission by Mr. V. D. Stace, economist of the Reserve Bank of New Zealand, whose services have been loaned to the Commission for the purpose. Cost of the survey, which is supported by the New Zealand Government, will be shared by the Administration of Western Samoa and the South Pacific Commission.

The stock-taking is the first stage of an economic survey of Western Samoa. It is being made to facilitate development of the island's resources, a major need of the increasing population, which has grown from 33,000 to 86,000 in thirty years.

Results of the survey will be of interest to other South Pacific territories in the Commission area faced with the same problem of expanding population and limited resources.

Between the 1st and 22nd June, 1953, ten lectures on leprosy were broadcast by the New Caledonian radio station, The Voice of France in the Pacific, Noumea.

The aim of these lectures was to give the public up-to-date information on leprosy, stressing particularly the technical and psychological problems raised by the rehabilitation of lepers.

At the same time, children from all schools were selling anti-tuberculosis stamps, the proceeds being divided equally between the French Red Cross and the Leprosy Committee, which will share with the local section of the New Zealand Lepers' Trust Board.

First of the series of lectures was delivered on 1st June by the Governor of New Caledonia, M. R. Angammarre. Suceeding talks were on:

"Leprosy in New Caledonia," by Médecin-Colonel Filippi, Director of Health.

"The Treatment of Leprosy," by Médecin-Capitaine Franco, Head of the Leprosy Service and of the Gaston Bourret Laboratory; Graduate of l'Institut Pasteur, Paris.

"The Evolution of Our Ideas on Leprosy Infection," by Dr. Tivollier, Medical Director of the First District and of the Municipal Bureau of Hygiene, Member of the Representative Assembly of New Caledonia, and Chairman of its Permanent Committee.

"The Rehabilitation of the Leper," by Professor Emile Massal, Professor in the Health Service of the Colonial Army, Executive Officer for Health to the South Pacific Commission.

"Public Psychology with Regard to the Leper," by Mr. Bernier, President of the Noumea Committee of the French Red Cross.

"The Christian and the Leper," by Abbé Lanson, Chaplain to Ducos Leprosarium.

"The Leper and God," by Pasteur Lacheret.

"The School and the Leprosy Problem," by Mr. Cormary, Director of Education, New Caledonia.

"Welfare Work and Leprosy Control," by Dr. Trubert, President of the Medical Association and of the Red Cross Committee of New Caledonia.

The texts of these lectures will be reproduced in the local press, and later will be published as a pamphlet for wide distribution.

The Rehabilitation Of the Leper

Adapted from a broadcast talk given over Radio Noumea on 10th June by

PROFESSOR EMILE MASSAL*

TO restore to his place in society the person in whom leprosy has been arrested or cured is the aim of the rehabilitation which, with detection and treatment, completes the pattern of control of a social disease which imposes on the patient a severe discipline, to the point of temporary loss of his liberty, and on society, heavy moral and material responsibilities.

After spending some time being treated in a special institution, or isolated at home, the released patient must recover his citizenship rights and perform the duties of an ordinary individual in society. For its part, society must accept him and restore to him the place which is his by right.

There are, therefore, two sides to the problem of the readjustment of the leper. I shall leave the subject of "Public Psychology in Regard to the Leper" to a more competent authority, and limit this talk to a study of the material and technical conditions of readjustment, or of adjustment, when the patients have contracted the disease in their youth.

First of all, one essential question must be answered: Can leprosy be cured or arrested and the leper restored to society without his constituting a focus of infection? Progress made in the early detection of the disease, and modern methods of treatment, result in most cases in a considerable reduction or even the disappearance of symptoms. Often the disease can be arrested and even cured with a minimum of scars. Once the disease is arrested, the patient is no longer infectious, but has to submit periodically to careful laboratory tests. Medical surveillance continues periodically for the rest of the patient's lifetime, for continual treatment will insure maintenance of this non-infectious state.

The Aim of Readjustment

When the individual has been restored to society, his physical state enables him substantially to resume his activities, providing his moral, intellectual and professional capacities are satisfactory. The aim of readjustment—or of adjustment—is to raise these capacities to a suitable level.

Readjustment must be a continuous process. It should begin when the patient is isolated in a special institution or at home, continue during treatment, and end with his rehabilitation in some stable activity suited to his condition.

This process, spread over a considerable period, will require an effort on the part of the patient. Particularly it will require of him the will to resume normal life, instead of a settling down to passive vegetation. This effort causes and maintains a considerable moral upheaval. Suitable physical and intellectual activity, particularly the former, will lessen when possible — and it is nearly always possible — the shock inevitably caused by the diagnosis of leprosy and its consequences.

Immediately upon isolation of the patient, readjustment must begin with an individual inquiry into his status in respect of family and society, occupation, means of existence, habits, and favourite amusements. Adjustment tests are not necessary; common sense

* Professor Massal is Executive Officer for Health to the South Pacific Commission.

and observation are sufficient to judge the reaction of the patient to his environment and to arrive at a classification indicating any steps to be taken.

Fairly large numbers of children contract leprosy, and are isolated. For this category of patients the solution is fairly simple. In almost all the isolation centres, there is a school which is regularly attended. The child can thus be instructed and educated like his healthy fellows, and, like them, acquire a basic education.

For adolescents and adults the problem is more difficult of solution. Orientation of the former must depend on their standard of education and on their own wishes. It should be possible for the latter to continue practising their own trades or, if this is not possible, to learn new ones.

Present possibilities certainly do not permit of providing, in small communities, vocational facilities to meet the requirements of all patients. It would, however, seem possible to equip, among other things, a dressmaking room for the women, and simple engineering and carpentry workshops for the men. For both sexes, there might be a workshop for various kinds of handcrafts, including the making of such items as mats, brooms, brushes, baskets and decorative articles.

The training of auxiliary staff for duty in the sanatorium, as, for example assistant nurses (male or female), assistant teachers, accountants and electricians, might also be considered as offering useful possibilities.

I remember training an assistant orderly in this way at Orofara, the Tahiti isolation centre. Evacuated from Reao, in the Tuamotu Archipelago, this patient had contracted a form of leprosy which we then called nervous; his only lesion was a claw hand. Successive laboratory examinations showed no trace of Hansen bacilli; the development of the disease had been arrested. Intelligent and loyal, this youth of eighteen was then already making himself useful by helping the nurses; he wanted to become an orderly to care for his leper compatriots. During his isolation he was given some basic ideas of medicine. On leaving Orofara, after a period of training at the hospital with other trainees, he was appointed auxiliary orderly. He always volunteered for the most arduous tasks, and gave such excellent service that he was put on the establishment. The rehabilitation of this former leper ended with his marriage and the joy of a happy and healthy family.

In the various South Pacific territories many lepers previously engaged in agriculture return to work on the land. Thus, at isolation centres, simple demonstrations of market gardening could be given, including, among other things, preparation of soil, care of seeds and plants, parasite control and marketing of produce. If stock is available, animal husbandry could be included.

The necessary instructors may often be found among the lepers themselves; among those who already have sufficient knowledge and experience to help their fellows. Then there will be voluntary workers willing to give the necessary demonstrations, perhaps using pamphlets, films, film-strips, posters, and so on.

Readjustment Following Discharge

Readjustment, started in the isolation centre, should continue when the patient leaves that establishment.

Ideally it should be undertaken, organized and financed by the community. There are various possibilities. The individual may resume immediately, within his family circle, his former occupation or a new one, in which case the problem is very simple. In other cases, resumption of work and of normal activities is possible only outside the family circle. Here, organizations for assisting lepers can help, perhaps by finding work for the former patient, by organizing further technical training for him in existing public or private establishments, or by providing financial assistance to replace or supplement wages which are inadequate during the interim period.

On resuming normal life, the former leper should be kept in close touch with welfare organizations, by correspondence, direct contact and visits from members. Thus a degree of incentive can be maintained; while difficulties may be foreseen or resolved as soon as they appear.

Medical Surveillance

The whole process of readjustment is always under medical control, designed to prevent the patient from undertaking any physical or intellectual activity incompatible with his state of health. This state is assessed periodically by clinical and laboratory examination, in the same way as his freedom from infection when the period of isolation has ended. Treatment is prescribed, and rules of hygiene laid down.

This conception of the rehabilitation of the former leper may impose upon the community and welfare organizations a large additional financial burden. I would, however, point out that for readjustment it is not essential to apply, from the beginning, all the measures which may appear necessary; it is better to begin on a modest scale and develop such an undertaking gradually, having regard to the reactions of the patient, available staff, equipment and money and improvements which may appear possible as the work advances. Once begun, the work of rehabilitation, on the part of both patient and community, should at all costs be carried on in spite of the obstacles which, particularly at the beginning will be many and very real.

The effort of the community should not be limited to technical and financial contributions. It must accept the former lepers restored to it, and there must be an end to the prejudices tending to exclude them from society, exemplified by this story of a native woman from the Austral Islands. Healthy herself, she went into isolation in Orofara with her leper husband (this being permitted by the regulations of that isolation centre). She lived with her husband for many years, comforting him with her affection and presence, and doing all the house work. Medically examined every quarter, she showed no sign of leprosy, even after more than twelve years of isolation, which ended in 1934 with the death of the patient.

This woman then had to leave the villages and the friends among whom her normal life had been led. She went to Tahiti, where, with no relations there to turn to, she courageously set out to look for work to earn her living. I am sorry to say her references were too heavy a handicap, and some weeks later she came back to offer her services as washer-woman to the lepers.

I have seen her since on several occasions, and she still shows no signs of leprosy. I have never dared ask her what she thought of the welcome

(Continued on page 43)

ABOVE: The Tarpen tea cropper, showing container for holding the leaf, and rubber paddles for sweeping out the leaf into the container. Behind the paddles is a reciprocating knife blade. RIGHT: A close-up of experimental pasture at excellent grazing stage. This pasture commenced as a mixture of Stylo and Guinea Grass, but Centro has outed Stylo from a considerable part of the plot. Picture shows a nice blending of Centro and Guinea in this plot.
—Photos courtesy Bureau of Tropical Agriculture, Queensland.

Tropical Research In Queensland

In view of the significance for some South Pacific territories of the results of agricultural and pastoral research carried out in the tropical regions of Queensland, the Commission recently sent a technical officer to prepare an account of the relevant research in progress. A comprehensive report has just been published by the Commission. In this article, the author briefly lists the research work being done in Queensland and illustrates its nature by some examples.*

By JACQUES BARRAU

Technical Officer, South Pacific Commission.

THE 670,500 square miles of Queensland, half of which lies in the tropics, constitute 22.5% of the Australian Continent.

Rural activities play an important part in the economy of the State, where the value of primary production in 1948-49 was as follows:

	£1,000 (Aust.)
Agricultural and pastoral production (including dairy farming, poultry and bees)	86,003
Forestry and fisheries	5,621
Mining	5,333

At the present time two million acres are under cultivation. In 1949 there were nearly six million head of cattle, or more than half the total number raised in Australia. A great number of these, perhaps even the majority, are raised in the tropical zone.

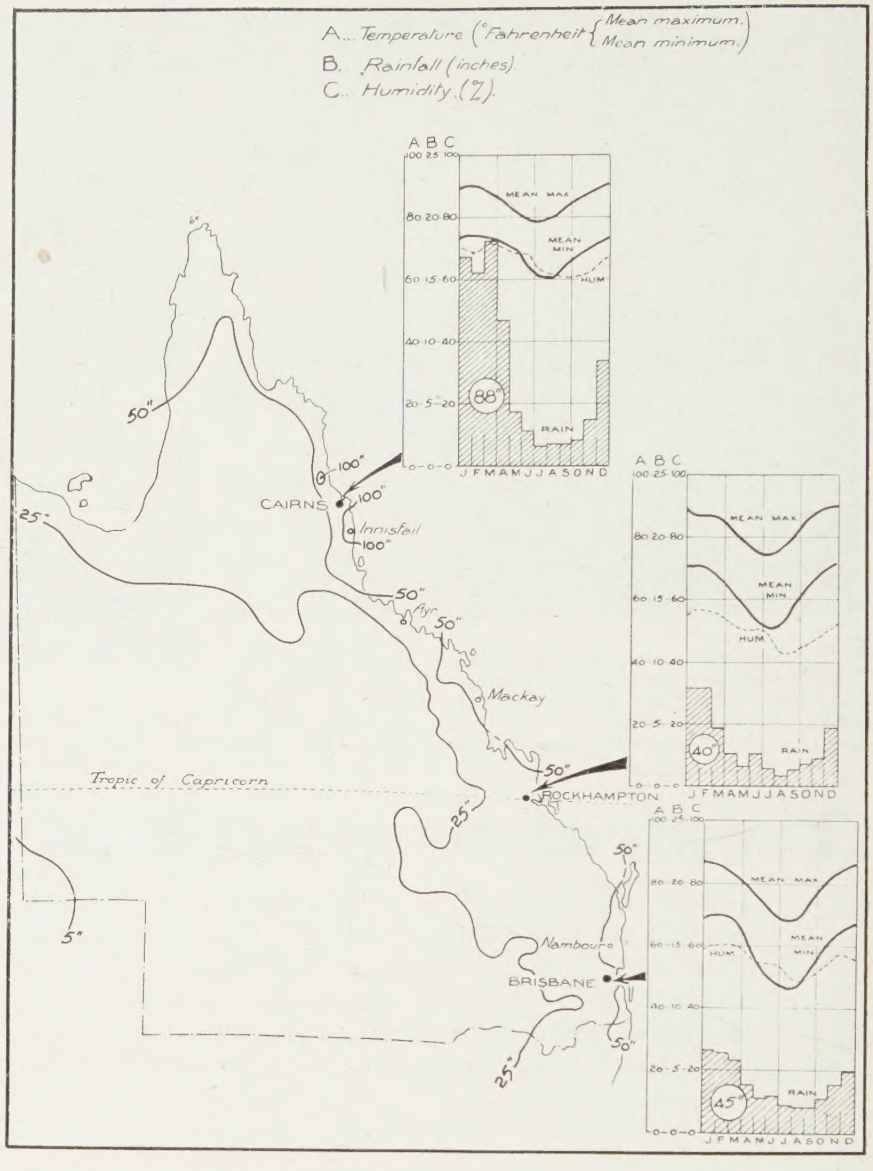
Sugar cane, to the value of £17,503,443 in 1949, accounts for nearly half the total value of crop production in Queensland. In addition, tropical fruits, including citrus, pineapples. custard apples, bananas, pawpaws and passionfruit represented a total value of £2,186,278. The tropical part of the State also produces significant quantities of other crops such as tobacco, maize, peanuts and sorghum.

The total value of agricultural and pastoral production is a reflection of the magnitude of agricultural research undertaken in the State. Because this research is largely concerned with tropical production, it has significance for the neighbouring tropical territories of the South Pacific.

The climate of Queensland varies from temperate in the south-west to arid in the west, and tropical in the north-east (see Figure 1). It will be noted that it is the coastal area lying between the Tropic of Capricorn and Cape York which most resembles the agricultural areas in the South Pacific.

* As Technical Paper No. 43 (see list on outside back cover).

FIGURE 1.—This map of Queensland shows isohyets, minimum and maximum temperatures, rainfall distribution, and humidity.



The various research institutions concerned with plant and animal industries in the coastal sub-tropical and tropical area of Queensland are:

The Queensland Department of Agriculture and Stock.
The Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.).
The Bureau of Sugar Experiment Stations.
The Queensland Department of Public Lands.
The Bureau of Investigations, Queensland Land and Water Resources Development.
The Faculty of Agriculture, University of Queensland.
The Queensland Agriculture High School and College, Lawes.

Table 1 summarizes the distribution of research work among these institutions.

The following notes on the research on tropical fruits, tea, sugar cane and tropical pastures will illustrate the practical usefulness of the work being done.

I. Research on Tropical Fruits

All the main fruit crops are subject to research, which is directed towards securing improvement in the yield and quality of fruit. The most important research centre for pineapples is the Maroochy Horticultural Station near Nambour, where a considerable amount of selection for the production of "Smooth Cayenne" commercial types of pineapple with a high yield is being carried out. The improvement of methods of cultivation and the prevention of erosion in the particular case of this crop are also being studied. The induction of flowering by the use of growth-promoting agents is receiving considerable attention. It has been found that the application of acetylene and the hormones alpha-naphthalene acetic acid and 4-chlor-2-methylphenoxyacetic acid will promote simultaneous flowering, giving more economic control of the crop under commercial conditions. The methods of application worked out are already being put to practical use by the pineapple growers. Further research is under way, mostly at the Ayr Regional Experiment Station, to examine the possible use of the same substances in influencing fruit development, for instance size of fruit.

Banana research consists mainly of physiological observations which it is hoped will result in an improvement of cultivation methods, notably as regards the best type of sucker to be used for renewing a plantation. In addition, a large collection of varieties has been made.

Research on citrus fruit includes the comparison of different stocks: (rough lemon, sweet orange, Emperor mandarin and *Citrus trifoliata*); the production of budwood of seventeen selected varieties of orange, mandarin, lemon and grapefruit trees; and an extensive programme of hybridization of the mandarin tree for the production of hardier types, of better quality and high yield.

The most interesting aspect of the work done on the pawpaw in Queensland is the creation, by hybridization, of commercial varieties suitable for the Australian market. The Bettina variety (Florida Betty x Petersen) is one of the best results of this selection programme. Similarly, the hybrid Bettina 100A x Petersen 170 seems very promising.

II. Research on Tea Cultivation

The Plant Industry Division began this research in 1949 at the South Johnstone Bureau of Tropical Agriculture, using three Assam hybrids first introduced in the Brisbane Botanical Gardens. Tests made by two large Australian firms have now proved that the tea produced is of suitable quality for use on the Australian market. These were only preliminary experi-

ments at a low altitude at South Johnstone, and experimental mountain plots have now been established.

The biggest problem still to be solved is harvesting, which cannot be done economically by hand. Use of the Tarpen tea cropper has already given interesting results, and a further series of experiments to test a new self-propelled mechanical tea cropper is under way. To that end, a new tea plantation has been established at South Johnstone, with lanes between close hedges of tea plants, to leave room for the passage of the tea cropper.

III. Research on Sugar Cane

This is the special field of work of the Bureau of Sugar Experiment Stations. Research has contributed to the striking development of this industry since 1900:—

	1900	*1948*	*1950*
Tons of sugar cane per acre	11.68	23.67	25.98
Tons of sugar per acre	1.27	3.26	3.42
Tons of sugar cane treated	848,328	6,518,021	6,691,706

An indication of the success of the cane-breeding programme is given by the increasing percentage of locally-developed varieties in the total harvest — 59.2% in 1948, 64.2% in 1950, 68.5% in 1952.

In 1951 the Bureau made 215 new crosses. The Meringa Station, near Cairns, which is the cane breeding centre, has maintained a collection of 150 to 200 varieties of sugar cane parents for the crosses which are carried out there each year. The collection was considerably augmented when, in 1951, the Bureau sent to New Guinea an expedition to collect from among wild sugar cane (*Saccharum robustum* and *S. spontaneum*) and the sugar cane grown in villages (*S. officinarum*), any varieties that might be useful in hybridization work.

The expedition explored the little-known region—from the point of view of the sugar cane—of the New Guinea Central Highlands, and collected 165 varieties of *Saccharum officinarum, S. robustum* and *S. spontaneum.* These were added to the collection of possible parents for the hybridization experiments which are carried out at Meringa, where locally-bred new varieties undergo a series of tests. Planting material of newly-bred varieties is sent to the Bureau's other stations at Ayr, Mackay and Bundaberg for local trials. All four stations receive material from varieties imported into Queensland, after they have passed through quarantine at Brisbane.

The activities of the Bureau of Sugar Experiment Stations are reported in detail in the various publications of the Bureau — the Annual Report, the Cane Growers Quarterly Bulletin, Technical Communications and advisory pamphlets. Furthermore, technical results of the Bureau's work are very frequently published in the *Proceedings of the International Society of Sugar Cane Technologists.* Table 2 will give an idea of the diversity and distribution of this research.

Table 1.

Queensland Research Institutions: Plant and Animal Industries

	Department of Agriculture & Stock	*C.S.I.R.O.*	*Bureau of Sugar experiment Stations*	*Department of Public Lands*	*Bureau of Investigations*	*University of Queensland*	*Agricultural High School & College*
Oil Plants	X						
Tropical fruits	X						
Vegetables	X						
Coffee and tea	X						
Sugar cane			X				
Fibres	X						
Tobacco	X	X					
Cereals	X						X
Spices	X						
Pasture and fodder	X	X					
Livestock and animal health	X	X					X
Plant pests and diseases	X		X				
Weed control	X	X	X	X			
Animal pests and diseases	X	X					
General farming practice (including irrigation)	X				X	X	X
Land use and soil survey	X	X	X	X	X	X	
Forests				X			

Table 2.

Diversity and Distribution of Research on Sugar Cane

1951-1952	*Brisbane Headquarters*	*Northern Station, Meringa*	*Lower Burdekin Station, Ayr*	*Central Station, McKay*	*Southern Station, Bundaberg*	*Field Staff Work*
Soils investigations	X					
Soil management, irrigation and and rotation	X		X	X	X	
Fertilizer and trash trials	X			X	X	
Cover crops and green manure	X			X		X
Cane breeding		X				
Seedling and varieties trials		X	X	X	X	X
Entomology	X	X				
Insecticides trials	X	X			X	X
Pathology	X					
Diseases trials	X	X		X	X	X
Weed control	X	X		X	X	

IV. Research on Tropical Pasture Improvement

The importance of stock raising in the tropical area of Queensland is well known. It is estimated that 65% of the total value of the State's income from primary industry comes directly or indirectly from grassland. Considerable research has been under-

taken to increase livestock production by improving pastures, and this has already had notable results. These are capable of almost immediate application in some South Pacific territories. Grassland research is co-ordinated by the Pasture Liaison Committee, which consists of representatives of the Department of Agriculture, the C.S.I.R.O., and the University of Queensland.

The history of tropical pasture improvement work in Queensland is closely connected with the South Johnstone Bureau of Tropical Agriculture, which was originally intended for research on crops other than sugar cane, suited to the hot moist tropical area of the State.

The initiative of a few pioneer graziers who thought of making the coastal lands a fattening area for cattle raised in the drier west developed interest in grassland improvement at South Johnstone. Added to that was the need for arresting the deterioration of pastures, which were too frequently burnt and over-stocked.

For the raising of fertility, it was considered necessary to introduce legumes capable of being grown in conjunction with the grasses already established. By 1939 the work had reached the stage where *Pueraria phaseolides* (Puero), *Centrosema pubescens* (Centro), *Calopogonium mucunoides* (Calopo), *Stylosanthes gracilis* (Stylo) and *Dolichos hosei* (Sarawak bean) had all been retained as the most promising legumes from the 200 species tested.

The war put a stop almost entirely to the activities of the Station, which resumed work only in 1944-45, with the following programme:—

(1) Introduction of plants;
(2) palatability trials;
(3) observation of grazing behaviour of cattle;
(4) comparative trials of various mixtures of legumes and grasses.

Details of the South Johnstone research may be found in the articles of the Director of the Bureau of Tropical Agriculture, Mr. T. G. Graham, in the *Queensland Agricultural Journal*.(1)

Other research on pastures in Queensland includes the work of the Regional Experimental Stations, the C.S.I.R.O. and the 89 observational and exploratory plots of the Department of Agriculture distributed over various regions in the State.

The South Johnstone experiments are still under way and the first results obtained are now ready for practical application.

The mixture which seems best suited to cattle grazing in the wet tropical coastal area of Queensland is "Centro-Guinea" or *Centrosema pubescens* and Guinea Grass (*Panicum maximum*). The pasture may be established after clearing and burning (in the case of new land) at the beginning of the rainy season, sowing Guinea grass at the rate of 6 lb. seed per acre and Centro at 2 lb. per acre. The Station advises that Guinea grass should not be grazed until after its first seeding.

In the first phase of the experiments at the Bureau of Tropical Agriculture, the liveweight gain of two-year-old Shorthorn steers grazing on various legume-grass mixtures in rotation averaged one pound per day.

To ascertain the value of each mixture, a further series of experiments is now being conducted on an annex of the South Johnstone Station at Utchee Creek. The principle of these experiments is not rotational grazing as before; each group of steers will use only one type of pasture. The pastures under trial are:—

(a) Mixtures of the legumes Stylo and Centro with grasses Guinea, Molasses or Para;
(b) pure stands of Guinea, Molasses or Para grasses;
(c) a mixture of the two grasses, Molasses-Guinea.

It is expected that liveweight gains on the pastures of mixed legumes and grasses at Utchee Creek will be higher than the average figures obtained on the South Johnstone series.

(1) (i) *Activities of the Bureau of Tropical Agriculture.* Q.A.J., February, 1948;
(ii) *Tropical Pastures Investigations.* Q.A.J., December, 1951.

Selected Official Publications

BELOW is a list of selected publications issued by the Queensland Department of Agriculture and Stock on tropical fruits, and pasture and fodder:—

Tropical Fruits

ADVISORY LEAFLETS:

No. 80	*The Acetylene treatment of pineapples.*	Lewcock. May 1945.
„ 90	*Propagation of citrus trees.*	Prest. Jan. 1945.
„ 109	*Harvesting and packing lemons.*	Williams. Nov. 1946.
„ 114	*Avocado varieties.*	Grozmann. Jan. 1947.
„ 119	*Citrus pruning.*	Prest. April 1947.
„ 153	*Citrus bud selection in Queensland.*	Agnew. Mar. 1949.
„ 157	*Selecting avocado varieties.*	Grozmann. May 1949.
„ 171	*Fertilizing pineapple plants.*	Mitchell. Feb. 1950.
„ 172	*Hormones and flowering in pineapples.*	Grozmann. Feb. 1950.
„ 180	*Banana plantation management, with particular reference to the one-bunch-one-sucker - straight - follow-through system.*	J. H. Mitchell. May 1950.
„ 192	*Harvesting and packing tropical fruits and strawberries.*	Gregory. Sept. 1950.
„ 204	*Maroochy experiment station.*	Ward & Fisher-Webster. Jan. 1951.
„ 217	*Banana growing in Queensland.*	Wills. Mar./April 1951.
„ 221	*Harvesting, handling, packing and marketing of bananas.*	C. G. Williams. June 1951.
„ 244	*Citrus growing.*	Ross. April 1952.
„ 254	*Weed sprays in pineapples.*	Cannon. Sept. 1952.

PAMPHLETS:

No. 40	*The use of acetylene to induce flowering in pineapple plants.*	Lewcock. Nov. 1937.
„ 62	*Pineapple plant selection, with special reference to the elimination of inferior types.*	Grozmann. Oct. 1945.
„ 64	*Root distribution of bananas.*	Summerville. Oct. 1939.
„ 93	*The Queensland nut.*	Wills. June/July 1945.

„ 102	*Pawpaw culture in Queensland.*	Agnew. April 1948.
„ 108	*Pawpaw latex production in Queensland.*	Agnew. Aug. 1945.
„ 123	*Passion fruit growing in Southern Queensland.*	Wills. June 1943.
„ 124	*Pineapple culture in Queensland.*	Grozmann. Aug. 1948.
„ 130	*The Mango.*	Stephens. Feb. 1949.
„ 141	*Harvesting, handling and packing of pineapples.*	C. G. Williams. Dec. 1949.
„ 142	*The avocado in Queensland.*	R. C. Prest. Jan. 1950.
„ 149	*The Pawpaw.*	Agnew. Oct. 1951.

Pasture and Fodder

ADVISORY LEAFLETS:

„ 33	*Renovation of Paspalum pastures.*	Winders. Jan. 1938.
„ 82	*Establishing grasses in coastal districts.*	Winders. Aug. 1945.
„ 100	*Fodder crops in the Mackay district.*	Goodchild. Aug. 1945.
„ 113	*Notes on Kudzu.*	Graham. Jan. 1947.
„ 225	*Green Panic grass.*	Marriott & Winchester. July 1951.

PAMPHLETS:

No. 45	*The varieties of guinea grass (Panicum maximum) cultivated in Queensland.*	White. Feb. 1938.
„ 85	*Queensland pasture plants.*	White, Everist & Winders. Handbook. 1941.
„ 86	*Pasture establishment, management and improvement.*	Winders. Handbook 1941.
„ 95	*Tropical legumes in South-Eastern Queensland.*	Schofield. Sept. 1945.
„ 122	*Activities of the Bureau of Tropical Agriculture.*	Graham. Feb. 1945.
„ 150	*Tropical Pasture investigations.*	Graham. Oct. 1951.

BULLETINS:

No. 19	*The effects of season, stage of growth and soil types on the chemical composition of grasses in the Queensland "wet belt."*	Cartmill. June 1944.
„ 26	*Protein content and yield of grasses in the wet tropics as influenced by seasonal productivity, frequency of cutting and species.*	Schofield. Sept. 1945.
„ 27	*Preliminary grazing trials with Stylosanthes gianensis — grass mixtures.*	Schofield. Dec. 1945.
„ 28	*Mineral content and yield of grasses in the wet tropics as influenced by seasonal productivity, frequency of cutting and species.*	Schofield. Sept. 1945.

Territorial College of Guam

By L. O. Andrews, Dean

ON June 30, 1952, the Territorial College of Guam opened its doors to 190 students for a six weeks' summer session. Most of the students were regular elementary school teachers. During the academic year 1952-53, three regular quarters of work of junior college level are being offered. Classes have been scheduled in the late afternoon and evening to accommodate teachers and employed persons. About one-third of the enrollees are non-teachers and include employees of the Government of Guam, military personnel, contract labourers and other civilians.

Beginning with the autumn quarter, 1953, the Territorial College will offer a regular daytime programme in addition to the evening classes. Approval has been given the College to furnish training to discharged veterans under the so-called "G.I. Bill of Rights." Many high school graduates, of whom there will be more than 160 on the Island in June, 1953, plan to take one or two years' college work in Guam before transferring to United States mainland colleges and universities.

The Territorial College was established as an integral part of the public school system under the Department of Education of the Government of Guam. Highly trained instructors, all with either Ph.D. or Master's Degrees have been secured. An arrangement was completed with the Ohio State University, Columbus, Ohio, in March, 1952, which provides for certain types of assistance from that institution for a five-year period. The Ohio State University selects and releases one staff member at a time to serve as an employee of the Government of Guam to co-ordinate teacher education and higher education on the Island. A Guam Advisory Committee at Ohio State approves the selection of all faculty members and assists in securing recognition by stateside colleges of the credits earned in the Territorial College. This plan permits the Territorial College during its formative stage to develop as an indigenous institution, but with the professional assistance of an established university, and without the necessity of a formal contract or any compensation whatsoever to the Ohio State University.

In addition to the college, the Student Loan Fund provides scholarships which assist students who are selected to attend off-Island colleges. Through these two approaches, the Government of Guam is fulfilling its responsibility for providing higher education as required by Section 9 (a) of the Organic Act of Guam, and Guamanian youth are being prepared to fill the many openings for well trained personnel in such fields as teaching, business, government and health services on the Island.

Rice Production in Papua and New Guinea

Under this title the Commonwealth Department of Territories has just issued a report by Mr. W. P. Poggendorff, of the New South Wales Department of Agriculture.

The report is a record of two visits made to Papua and New Guinea in 1952 by Mr. Poggendorff at the invitation of the Department of Territories, to inspect and advise on the rice development work being carried out there.

Mr. Poggendorff concludes that largely because of this research the territory is within sight of producing its own rice needs. Further, he considers that by developing further areas suitable for flooded rice culture, it could become a major exporting country. [A detailed review of this report will appear in the October *Quarterly Bulletin.*—Editor.]

Pakistan Cattle Introduced Into Papua

With the main objective of developing improved strains of cattle suited to tropical conditions, two shipments of cattle were recently imported by air into Papua from Pakistan. This account of the project was contributed by . .

The Department of Territories,
Commonwealth of Australia.

Above left: **Loading the cattle at Karachi into the DC3 freighter used for the airlift. Above: The cattle being unloaded at Port Moresby after their 6000-mile air journey.** —Photos courtesy Qantas Empire Airways

CATTLE and buffalo calves have been imported to Papua from Pakistan for scientific investigations by the Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.) and the Administration of Papua and New Guinea, in order to assist development of the cattle industry in northern Australia and in Papua and New Guinea. The stock was made available by the Pakistan Government under the Colombo Reciprocal Aid Plan.

The C.S.I.R.O. has been anxious to obtain cattle from Pakistan for such experimental and developmental work for some time, but was unable to make satisfactory quarantine arrangements in Australia.

Since pre-war days, planters in Papua and New Guinea have sought to make importations of cattle and buffaloes from India or Asia, but the territory had not the veterinary organization to ensure safety from introduction of serious diseases had the importations been made.

Now the Administration, with the aid of C.S.I.R.O. veterinary specialists, has introduced stock, after careful selection and testing in Pakistan, to a part of Papua where the cattle population is small and scattered in isolated groups.

The introduction of four water buffaloes and eighteen Sahiwal and Sindhi cattle was completed on 18th December, 1952. The importation was made by air, the first plane load arriving on 4th December, 1952, and the second on 18th December. Eleven beasts were carried on each shipment.

Officers of the C.S.I.R.O. were responsible for the selection and screening of the cattle in Pakistan before

shipment, and the stock was under their surveillance for a period of from three to five weeks prior to embarkation at Karachi. An officer of the C.S.I.R.O. accompanied each shipment to minimize the danger from contagion during transit.

Elaborate precautions were taken to ensure that the cattle were free of exotic diseases endemic in Asia, and to prevent contact with the possible sources of infection en route. The charter planes carried fodder from Australia for feeding the cattle on the return journey. At no time did the cattle make contact with the ground between Karachi and Port Moresby. To minimize the possibility of contamination to the aircraft or ports of call, the cattle were held within the aircraft by specially-constructed hurdles on an impervious canvas floor which was removed with the cattle.

On arrival in Port Moresby the cattle were taken to an animal quarantine station at Kila Kila, where they will remain in quarantine for an indefinite period, possibly eighteen months. During this time (when the strictest quarantine precautions will be taken) they will be subjected to daily routine temperature checks and examinations, and to regular routine laboratory tests. In the quarantine facilities provided by the Administration, C.S.I.R.O. scientists will check that measures taken have been successful in excluding diseases such as rinderpest and foot-and-mouth disease.

Zebu Strain

The Sahiwal and Sindhi cattle are essentially a milking type Zebu strain of the old sacred cattle of India, and have never previously been introduced into the territory. The idea behind their present introduction into Papua and New Guinea is to use them for experimental cross-breeding with European cattle to produce a beast with the best qualities of both types; the Zebu contributing hardiness and adaptability to hot, tropical environment, and the European contributing high production of beef and milk.

The most promising crosses between the imported and local breeds will be determined by trials, and may then be bred in large numbers in Papua and New Guinea; the physiological causes of their superiority will be identified and fixed in the genetic make-up of what may ultimately become a new breed of cattle.

The water buffaloes that will be used by the Administration of Papua and New Guinea are of the Murrah breed, a dairy type. The water buffalo is the most important dairy animal in India and Pakistan. This imported stock will be crossed with the common type, and the crosses tested as dairy, beef and draught animals in the wet lowland tropics of Papua and New Guinea. Similar crosses in the Philippines have proved most successful.

Preparing Parboiled Rice: Two Improved Methods

ALL methods used for parboiling rice claim that the valuable nutritive substances are retained by diffusion from the bran of the rice grain to the inner part of the grain. Parboiled rice has therefore a very high nutritional value.

The traditional practice of parboiling rough rice (paddy) in Pakistan is done in the following stages:

(a) soaking of the paddy in hot water for some hours;

(b) drying in the sun;

(c) hulling or milling in the usual way.

It is estimated that more than half the production in Pakistan is consumed as parboiled rice. It is therefore the most important rice product in Pakistan. This indigenous parboiling process has some disadvantages, among which in the first instance should be mentioned its rather poor keeping qualities, resulting in bad taste and smell. Furthermore, the cooking of this product takes more time than the cooking of ordinary rice, and lastly, it is often unattractive in appearance.

At Saigon, improved processing is carried out in a large-scale industry, the stages being as follow:

(a) the cleaned, unhusked grains (paddy) are put in large containers, where they are soaked for fifteen to thirty hours in water;

(b) in an autoclave, the rice is exposed for ten to twenty minutes to steam which is brought in through a metallic spiral provided with several openings and reaching a height of three-quarters to four-fifths of that of the grain. The pressure of the steam is 1 to 1.5 kgms. per sq. cm., resulting in a temperature of 120° to 130° C.;

(c) the rice, then having a moisture content of about 30%, is dried in a mechanical drier with hot air, thus bringing the moisture content back to 12-13%. This is essential to obtain good keeping quality;

(d) the dried grains are then hulled and polished in the usual way.

An Alternative Process

A slightly different way of preparing parboiled rice is described in *Information and Research in 1951*, issued by the Tropical Products Department of the Royal Tropical Institute, Amsterdam. The process was developed by Dr. D. S. Fernandes, Paramaribo, Surniname.

The most important point about this process is that it is a continuous one: rough rice is first soaked in water at 75-95° C., exposed for a very short time to steam at 100° C., and then dried in not-too-hot air. During this process the rice does not get too wet, and does not stay wet for long. Consequently there is no danger of a disagreeable smell developing. The entire apparatus is open. Locomotion of the grains is effected by an endless screw.

Compared with ordinary factory-produced rice, factory-produced parboiled rice has better keeping qualities. The hulling process is easier, with hardly any broken rice, and the appearance is good (transparent grains without a white spot). Cooking is easier, as the grains do not stick together, while smell and taste are excellent. But above all, the rice is of the same nutritional value as the village husked rice. A.H.K.

Dr. Laird taking a pH record near Suva, where he has set up a fully-equipped laboratory and field headquarters.

The Quarterly Bulletin for January, 1953, contained an account of an investigation being made with the objective of discovering why some territories of the south-west Pacific are heavily infested by the malaria-carrying anopheles mosquito, while in others it is quite unknown. The project is being carried out for the Royal New Zealand Air Force and the New Zealand Department of Scientific and Industrial Research by Fl. Lt. Marshall Laird, assisted by his wife. Below is a brief non-technical account of their field activities to date.

By Dr. MARSHALL LAIRD

Medical Branch, Royal New Zealand Air Force

Sidelights On Malaria Research

SINCE May, 1952, our base of operations has been a small laboratory at the Colonial War Memorial Hospital, Suva. It will continue to be our headquarters until early 1954. In this laboratory we have all the equipment necessary for both entomological and protozoological research, while an extensive microfilm library renders us independent of outside sources for all but the most recent literature, and enables the preparation of adequately referenced papers without undue loss of time.

During the first part of the project we have aimed at obtaining as much data as possible on mosquito ecology and malaria incidence about the southern perimeter of the malarious zone of the Pacific. To date three major field trips, each of approximately a month's duration, have been made. First, in August-September last, we spent a few days at Aneityum, the southernmost outpost both of the New Hebrides and of the malarious zone. We then went on to Espiritu Santo to spend a month there and on neighbouring small islands. Two months afterwards we were based at Noumea while undertaking research in that area, and in the north of New Caledonia and the Belep Islands. While back at Aneityum for a more extended stay in February and March of this year, we were able to arrange a visit to Futuna (or Erronan), the most easterly island of the New Hebrides.

Two shorter trips were made later in March, one to Aitutaki and the other to Uvea, Loyalty Islands. In between visits to other island groups, considerable collecting has been done on Viti Levu itself. Finally, two brief flights to New Zealand have been made: the first to obtain literature pertinent to the field results achieved at Aneityum and Santo, and the second for a mosquito survey at Harewood Aerodrome (Christchurch) which has recently become an international airport.

Over the past year we have set up field headquarters in all kinds of places, ranging from a modern hotel to isolated mission stations and native huts.

Equipment for Field Work

Other than on the New Caledonian trip, transport between Fiji and other territories has been by R.N.Z.A.F. Catalina flying boat. This arrangement not only gives us a freedom of movement which would have been the envy of biologists of an earlier era, but allows of our carrying a well-equipped field laboratory on each major assignment. The apparatus normally taken along includes our Zeiss-Winkel GF 525 microscope, which has built-in lighting powered by a 6-volt car battery. Accessories for this instrument include phase-contrast gear and an attachment camera, which greatly extend the scope and value of the protozoan studies we are able to undertake in the field, particularly when time is at a premium.

Besides investigating the southern and eastern limits of anopheline distribution in the South Pacific, we are also endeavouring to obtain data on the altitudinal range of these mosquitoes in the malarious islands. Thus, while at Espiritu Santo last year, a trip was made into the hill country of the south-western part of the island. Here, blood smears were taken from inhabitants of some of the highest villages of the New Hebrides.

While based at the French Hospital at Luganville, on Second Channel, we spent several interesting days on the small island of Tutuba.

Some seven miles from Luganville, although its closest point comes to within two miles of Santo, this raised coral island is some three and a half miles long and seldom more than a mile wide. Its northern end is low-lying and planted with coconuts almost from coast to coast, but the southern end, which rises to an altitude of 240 feet, is bush-covered. The native inhabitants dwell on the western side of this part of Tutuba. Our visit had as its object the gathering of information concerning the absence of anopheline mosquitoes from the island, an intriguing phenomenon when the proximity of the highly malarious Santo coast is considered.

Probably the most significant part of our investigation, that dealing with mosquito ecology, will be the last to show results. Among other things, this work involves the collection of physical and chemical as well as biological information from actual anopheline habitats, for ultimate comparison with data gathered at outwardly similar habitats in anopheline-free parts of the Pacific. Many of the insects and plants thus accumulated have to be sent to specialists in various parts of the world for determination. This all takes time, and the field work will possibly be long since completed before all the significant data are at hand for final assessment.

This photograph illustrates one of the many ways in which mosquitoes can spread from one island to another. This beached canoe at Aitutaki held water containing larvae of three species of mosquitoes.

Papers For Early Publication

However, in the course of the ecological survey itself a considerable amount of new information is constantly coming to hand. Wherever it seems worthwhile, these new data are being forwarded to appropriate journals for publication independently of the main results of the project. For example, mosquitoes and malaria at Aneityum form the subject of the first of the papers dealing with our work there, soon to be published in the *Bulletin of Entomological Research.*

Just over a century ago the home of at least 12,000 people, this island is a lonely place today. In common with so many other Pacific peoples, the Aneityumese were disastrously affected by diseases introduced when quarantine barriers of long standing were broken down with the arrival of Europeans. Ravaged by epidemics, their numbers were already reduced to some 3,500 when a large stone church, intended for a congregation of 1,000, was built at Anelgauhat by the Presbyterian Mission in 1859. Two years later a measles outbreak reduced the population by a further third, and the decline that continued from then on has never been arrested. Today, the one hundred and fifty or so remaining Aneityumese could crowd into a small corner of the ruins of the old church. These ruins stand, the former cultivations and village sites being long since overgrown, as the only tangible gauge of the former importance of the Anelgauhat settlements.

We have now, thanks to the hospitality and co-operation of Mr. A. D. Stevenson and the others belonging to the Aneityum Logging Company, made comprehensive ecological studies of mosquito larval habitats on the island; and have also obtained blood smears for haematozoan work from a large majority of the inhabitants.

New mosquito distribution records for Noumea and the Belep Islands form the subject of a second paper to appear shortly in the *Bulletin of Entomological Research.* The record from Noumea, incidentally, is of an Australian mosquito almost certainly introduced into New Caledonia since the end of the war.

Insect Introductions By Transport Services

This brings me to another phase of our activities, the collection of insects from aircraft and vessels of various kinds, and mosquito surveys of airfields and port areas. For some years now the R.N.Z.A.F. has been concentrating its entomological research on the part played by aircraft in the transport of undesirable insects from country to country, and one of our aims is to extend the work already completed in New Zealand as widely as possible throughout the Pacific. For if it proves beyond any reasonable doubt that *Anopheles* could become established in the islands east of 170°E, it is essential that as much data as possible be at hand for the devising of control measures to guard against any accidental introductions taking place. We already know that mosquitoes can survive the vicissitudes of long air journeys, even those made in unpressurized compartments of high-altitude aircraft; and it is essential for the future welfare of the as yet malaria-free islands that every attention be paid to the problems involved as more and more air links

are established in this part of the world.

Subsidiary Survey

Finally, in spare moments from our main investigation, as wide as possible a survey of the haematozoa of Pacific island vertebrates is being carried out. Although the importance of this side-project is largely fundamental, sooner or later it may acquire a degree of applied significance. Until the commencement of our survey practically nothing was known of the blood parasites of Pacific birds and reptiles, although these parasites have been very extensively studied in other parts of the world in recent years.

Many such parasites which we have now recorded from the New Hebrides, New Caledonia and the Cook Islands are of mainly academic interest, belonging to genera which have not medical significance; but *Plasmodium* has been found in the blood of some of the birds examined. Much of what has been revealed of the life cycle of the malaria parasites in recent years has resulted from experimental work on the bird malaria parasites in overseas laboratories, and the more that can be learned of the occurrence and availability of the various species in the islands of the South Pacific the better the chances that our Australasian research centres can play a more prominent part in this phase of malariology.

Our studies in this direction involve tobacco and barley sugar transactions with the natives whom we encounter (the men are often excellent shots and collect all the birds we need, while the children bring us in large numbers of reptiles); their most interesting result to date has been the recording of *Plasmodium vaughani,* a species of avian malaria parasite known before only from North America and Kenya, from New Hebridean birds. A paper reporting this, and also detailing the first observations of exoerythrocytic schizogony in this species, has recently appeared in the American *Journal of Parasitology.*

Trade Statistics of South Pacific Territories

The accompanying tables relate to the value and direction of the external trade of the South Pacific territories.

Table I shows the total value of exports and imports and the trade balance in 1938, chosen as a typical pre-war year, and in 1951, the most recent year for which almost complete information is available. The table illustrates the considerable increase in the value of external trade since 1938. The changes in the volume of total exports and imports, however, are not known for most territories.

Tables II and III indicate the direction of the trade of eleven territories in 1951. Table II shows the main countries of origin of imports, and Table III shows the main countries of destination for exports, in relation to the territories named. Information that would enable other Pacific island territories to be included in these tables is not yet available at Commission headquarters.

TABLE I — EXTERNAL TRADE OF SOUTH PACIFIC TERRITORIES(1)

VALUE IN LOCAL CURRENCIES FOR CUSTOMS YEARS ENDING IN 1938 AND 1951

TERRITORY	CURRENCY UNIT	1938 Imports	1938 Exports	1938 Excess of Exports over Imports	1951 Imports	1951 Exports	1951 Excess of Exports over Imports
New Guinea ..	£A.	1,610,967	2,980,360	1,369,393	6,077,620	5,436,548	— 641,072
Papua	£A.	631,497	435,593	— 195,904	4,600,188	1,923,289	—2,676,899
Norfolk Is. ..	£A.	31,546	11,507	— 20,039	128,743	18,420	— 110,323
Nauru	£A.	268,728	546,683(2)	n.a.	720,752	1,378,578(2)	n.a.
New Caledonia	Fr.CFP.(3)	158.6	146.5	— 12.1	1,027.3	688.3	— 339.0
French Oceania	Fr.CFP.(3)	63.2	47.6	— 15.6	709.1	643.8	— 65.3
Neth. N. Guinea	Guilder	n.a.	n.a.	n.a.	19,470,937(4)	14,257,200	n.a.
Western Samoa	£NZ.	196,272	245,480	49,208	1,194,698	1,721,942	527,244
Cook Is.	£NZ.	74,789	73,184	— 1,605	437,396	314,628	— 122,768
Niue	£NZ.	n.a.	n.a.	n.a.	83,447	55,555	— 27,892
Fiji	£F.(5)	1,669,440	2,518,590	849,150	9,361,377	7,297,214	—2,064,163
Solomon Is. ..	£A.	216,541	292,267	75,726	618,882(6)	857,980(6)(7)	n.a.
Gilbert and Ellice Is. ..	£A.(5)	207,500	353,750	146,250	255,859(6)	n.a.	n.a.
Tonga	£T.	83,026	86,196	3,170	889,373	1,388,564	499,191
American Samoa	$	194,256	110,677	— 83,579	790,978	197,655	— 593,323
Guam	$	635,112	150,050	— 485,062	12,504,246	2,231,192(8)	n.a.
T.T.P.I.(10) ..	$	n.a.	n.a.	n.a.	2,223,174	2,213,622	— 9,552
New Hebrides ..	Fr.CFP.(3)	n.a.	n.a.	n.a.	141.8	405.8	264.0

(1) All figures for imports and exports are from official records. The value of specie and coin have been excluded wherever possible. Re-exports are included. In columns 5 and 8 above, it should be noted that a minus sign denotes excess of imports.
(2) Phosphate exports only. (3) Millions. (4) Exclusive of Government services and Petroleum Co.
(5) Rounded figures for 1938 given in sterling in the "Statistical Abstract for the British Commonwealth" have been converted at the rate of £111 Fijian to £100 sterling and £125 Aust. to £100 sterling. (6) 1950 figures. (7) Exclusive of timber exports.
(8) Exclusive of copra exports. (10) Trust Territory of the Pacific Islands, under U.S. administration.

TABLE II — MAJOR SOURCES OF IMPORTS OF ELEVEN SOUTH PACIFIC TERRITORIES IN 1951

All Values are in United States Dollars.

IMPORTS FROM:	NEW GUINEA	PAPUA	NEW CALEDONIA	FRENCH OCEANIA	WESTERN SAMOA	COOK	NIUE	FIJI	TONGA	GUAM	NEW HEBRIDES	TOTAL
Australia	8,254,940	6,407,805	4,320,650	1,034,103	658,634	44,880	736	6,843,940	518,387	124,612	1,042,686	29,251,373
United States	1,010,245	560,096	3,568,034	4,441,301	394,770	35,255	1,582	1,461,682	58,084	10,396,226	85,126	22,012,401
United Kingdom	917,936	1,853,746	115,652	238,881	704,295	248,294	7,610	7,708,534	364,667	—	63,793	12,223,408
France	—	—	6,455,917	2,739,274	10,361	—	—	53,977	—	—	500,322	9,759,851
New Zealand	—	—	22,867	902,090	862,208	775,774	210,537	1,781,628	593,599	—	49,542	5,198,245
Hong Kong	1,132,360	276,653	—	—	52,663	—	—	398,533	17,727	339,184	99,031	2,316,151
India	417,110	166,412	17,193	—	123,832	—	—	1,237,198	14,147	—	—	1,975,892
Indonesia	—	75,058	508,722	—	52,956	—	—	1,167,871	—	—	—	1,804,697
Japan	—	—	28,823	—	45,580	—	—	421,589	1,794	973,706	867	1,472,359
Canada	—	—	58,086	—	198,801	30,173	—	1,034,107	76,570	—	—	1,397,737
Other countries	1,881,278	964,651	1,048,799	1,788,465	228,677	85,801	12,322	1,505,201	452,069	670,518	387,361	9,025,142
TOTAL IMPORTS	13,613,869	10,304,421	16,144,743	11,144,114	3,332,777	1,220,177	232,787	23,614,260	2,097,044	12,504,246	2,228,728	96,437,166

N.B.—The above figures are derived from official records, relating to local Customs years ending in 1951. Values of specie and coin exported from New Guinea and Fiji are excluded.

TABLE III — MAJOR DESTINATIONS OF EXPORTS FROM ELEVEN SOUTH PACIFIC TERRITORIES IN 1951

All Values are in United States Dollars.

EXPORTS TO:	NEW GUINEA	PAPUA	NEW CALEDONIA	FRENCH OCEANIA	WESTERN SAMOA	COOK	NIUE	FIJI	TONGA	GUAM	NEW HEBRIDES	TOTAL
France	—	—	7,489,172	6,935,408	—	—	—	22,312	—	—	6,174,547	20,621,439
United Kingdom	5,311,170	558,228	—	—	2,708,827	—	—	6,552,089	2,996,817	—	—	18,127,131
Australia	6,270,934	3,691,715	265,865	122,584	468,710	296	18,239	1,286,937	12,593	—	164,482	12,302,355
United States	17,046	52,163	2,012,526	603,489	925,424	321,570	—	2,683,265	59	2,209,163	25	8,824,730
New Zealand	—	22	—	231,023	668,573	547,403	135,490	3,557,626	232,311	—	—	5,372,448
Canada	—	—	—	—	449	—	—	2,429,436	—	—	—	2,429,885
Japan	—	—	169,590	1,933,050	—	—	—	6,811	—	—	—	2,109,451
Other countries	578,717	6,039	880,135	292,315	31,615	8,430	1,249	1,868,891	32,303	22,029	38,786	3,760,509
TOTAL EXPORTS	12,177,867	4,308,167	10,817,288	10,117,869	4,803,598	877,699	154,978	13,407,367	3,274,083	2,231,192	6,377,840	73,547,948

N.B.—The above figures are derived from official records, relating to local Customs years ending in 1951. Values of bullion, coin, bank and currency notes imported by New Guinea, Papua and Fiji are excluded.

Visual Education

The Commission's film library continues to be a very popular service and the Commission films are constantly in demand. New films that have arrived during the last three months are:

Animals of the Rocky Shore (French commentary).

Community Development (Ahoada Division).

Copra.

Daybreak in Udi (community development).

Fight T.B. in the Home.

Men of Rochdale (history of co-operative movement).

Pollination (French commentary).

Salt Water Wonderland (underwater photography).

The Mosquito.

Tree of Wealth (coconut cultivation).

Papuan Rubber.

Yaws.

South Pacific Conference Film.

All these titles are now available on free loan to the territories for appraisal, and copies of the catalogue listing all films and filmstrips in the library may be had on application to the Executive Officer for Social Development. Reviews of films and filmstrips are to be found in the Literature Bureau's journal *Pacific Reading*, of which No. 3, June, 1953, has recently been published.

The first of a proposed series of filmstrips on the Co-operative Movement in the Pacific has been completed. The title is *Co-operative Societies in Fiji*, and copies may be purchased for cost of print (approx. 3/-).

Work is nearly completed on the editing of a small amateur film from Netherlands New Guinea on village life in the Schouten Islands. This material, which was given to the Commission, has been put into a more coherent form, and titles prepared in English and Malay.

Work is also being done in translating written material into visual form, i.e., cartoon picture strips for use as teaching aids.

At the Unesco Meeting on Visual Aids to be held in Sicily during September, the Commission will be represented by Mrs. N. Phelan, Assistant Organizer for Island Literature, who will attend as an observer.

EDUCATING THE NETHERLANDS NEW GUINEA VILLAGE

This article was originally prepared by Dr. van Baal as a memorandum for the Symposium on Popular Education organized by the Afrika Instituut in Leiden in April, 1952.

By JAN van BAAL

A small Papuan village on the island of Japen in Geelvinck Bay, Netherlands New Guinea. Its inhabitants live in complete isolation from the outside world.

A VILLAGE in Netherlands New New Guinea is but a small affair. Usually it consists of some twenty or thirty houses, grouped on both sides of a large kind of street. Its population rarely exceeds 300 people; the average might be around 200. Often, at the end of the street, a school is found with the teacher's house next door. On Sundays that school is used as a church. And that is all, if you wish to neglect the all-pervading silence which reigns everywhere, and constitutes one of the most fundamental traits of primitive life.

Though this average village appears very small and insignificant, it is nevertheless likely to be the result of a concentration of even smaller groups of people who used to live in different parts of the territory claimed by the village, each of them close to its own gardens and sago groves.

While Papuan civilisation in Netherlands New Guinea may show as astonishing diversity of structure and *ethos*, there is one fundamental trait common to the vast majority of tribal cultures. It is their aversion from the authority exerted by the larger social group. Somehow the Papuan is an individualist, always ready to withdraw with his family into the loneliness of his vast country, because he prefers an often boring and uneventful life to the obligations which accompany the in-itself-appreciated cheer and activity possible in a bigger social centre.

However, his type of individualism is quite another one than that embodied in the European concept of individualism. The latter presupposes a more or less critical attitude and a somewhat enhanced conscious life, which are absent in the Papuan's outlook. When the latter retires to the loneliness of his far-off gardens, he

Hollowing out a dugout canoe.

does so in obedience to a rather dim, sub-conscious preference to be left alone. He is no critic, and he is certainly not given to intellectual speculation. He does not bear any resemblance to the primitive philosopher who played such a prominent part in older anthropological theories.

If we are to define his attitude we should call it a non-reflective one, an attitude which is characterised by a certain degree of aversion from clear thinking. His world is not one where A distinctly is the cause of B, but a world full of mystery, where he has to find his way and take his stand with the assistance of a not-less-mysterious magic, which expresses both his feelings of awe and those of relatedness with that surrounding world.

Effect of Education

To-day these peoples, as far as they have been brought under control, have a more or less permanent abode in the village, where their children visit the school to receive some elementary education. What is the effect of this school upon the village community? How does it affect its life? That school belongs to a different world. It is an outpost of what is called the big world, where even those primitive peoples of New Guinea will one day have to take their stand, where our Papuan friend still has to find his place.

Many a curious thing is taught in that school. If the teacher is good in his profession he will ask his pupils, when they have finished reading a lesson, to tell its contents in their own words. Thus they are made more conscious of what they are doing, and of their world. Though the teacher may not be very successful, because the *ethos* of the older generation does not encourage this type of conscious living, we may be sure that within a couple of generations quite a different attitude will be the result.

There is a lot more these children learn. Their knowledge of arithmetic may be very unsatisfactory and that of reading and writing but slightly better, but they will all understand that the world of their fathers, that small and mysterious little world, is not the real world at all. There is only one real world, that matters: it is the world of schools, of big ships and planes, of trade goods and films, of motor-cars, luxury and prosperity.

The real world, however, is not theirs. They may be in a position to procure some of its numerous goods by trading copra or vegetables; they may even see a good deal of it by entering the service of the oil company on a year's contract and thus enjoy film, radio and the pleasure of riding in a motor-lorry; but that world always remains a foreign one, the white man's world, rich, uncomprehensible, forbidden and coveted. There is only one narrow space where the Papuan may enter and where he is even welcomed without being reminded of his inferiority: that is the church, where he is called a brother and acknowledged a place of his own. But that same church is on rather bad terms with that wonderful world it opens, and thus cannot give him what he would like most.

Thus the first result of education is a feeling that the old life is not worth the living because it does not really matter. What matters is that real big world, which is closed to them. The teacher may try to persuade his pupils, to assure them that they may procure themselves a place in that world and ensure progress and prosperity by gathering a lot of learning, but none of them is able to follow that advice except the chosen few, who are elected to become pupils of the higher grade elementary schools. Here the more clever boys and girls of a whole area get a three years education, after which they may enter a school for vocational training and become teachers, nurses, skilled labourers or members of the native civil service. And here again it must be said that none of these occupations, though honourable in themselves, will enable them to experience that wonderful and mysterious world as a thing really their own.

It is not surprising, then, that the results of education in the village are not altogether too good. The school is a three grades course, but the average pupil in the northern part of the island takes six years to complete it, and in the southern part up to eight or nine years; all this notwithstanding the fact that the curriculum of about half of these schools hardly reaches farther than that of the first two grades of a European school. But

who would bother about it? What is the boy going to do who has finished his course? In the more remote parts of the island (and most of its parts are rather remote) his only choice is between returning to the life of his fathers or leaving the village looking for work elsewhere. Under these circumstances the village teacher—who invariably is a subsidized mission teacher—is not in a hurry to have his pupils finishing their school-going period. Life after school is not affiliated with school life. Village life as it is today has no use for the three R's, except on Sundays when the people go to church. The trouble is that the village as such has no place in that big real world which is known to exist somewhere on a far-off horizon. And here we come near the core of the problem. Life has lost its fundamental meaning, and no one has been able to give it a new one strong enough to shape a new form of life, because the village in which they live is not affiliated with the world which they have recognized as the real world that matters.

The result is a boring village life, where dancing and feasting rarely occur and have lost their old glory. We owe that only partly to the activity of the village teacher. Though he is known to be greatly opposed to dancing, he could never have been thus successful if these things had not lost their inner necessity. They are no longer done because they really should be, either for one's well-being or for the enhancement of social prestige. Where life is losing its meaning these things are losing theirs too, and though they may bring some short hours of thorough amusement, they no longer appeal to the imagination of the younger generation as great and important features of their existence.

Repeatedly, commendable attempts have been made to introduce new feasts which are more adapted to the modern situation. They have had some success, and in various parts the period round Christmas is really a feast period, which as such is highly appreciated. But the time seems still far off when we can look upon these feasts as really their own. They are lacking in spontaneity and emotional satisfaction. These people want something more.

Cargo Cults A Result

How much they do is proved by the spiritual movements, in modern literature known as cargo-cults, which arise every now and then. They all aim at the arrival of a culture-hero, or sometimes of the spirits of the dead, who will enable them to share all the benefits of European civilization. The only thing to be done is either praying or dancing, very often both of them, and then the wonder will happen. It is noteworthy that one of the elements invariably is that all labour should be stopped. It proves that our exhortations about the value of hard working are not at all appreciated. Another point is the apparent misunderstanding of the teachings of Christianity. Their more important expectations are of a distinctly secular character and they still expect their fulfilment in a magical way, by feasting and dancing. This means that, though the new religion caused a different attitude, it failed to change at least part of the structure of their fundamental concepts about the world. Even this new and big world, however, different from that of their ancestors, is still seen as a mysterious world which should be handled by magic and ritual, not by rationalized activity.

These spiritual movements, though always a failure, are a more or less recurrent event in these societies. It is not amazing that it is so: the peoples of Asia, when they fought their way to a place of their own in the newly-detected modern world, could do so by choosing nationalism as a device. By becoming a free and independent nation they created a place in the world which was their own and proper place. But such a thing is not possible for the inhabitants of Netherlands New Guinea. They are far too few in number, too much scattered over huge areas to dream of any solution of this kind. And thus they are what they are: more or less displaced persons in their own country, gradually declining in number, the best among them migrating to the coastal townships as labourers, where they become the founders of a new proletariat. The only way out from this distressing situation is to give more purport to village life, to make it something of interest, something that really matters because it is adapted to their concept of the real world of today.

The Ideal Village

To face this problem we want a clear idea of what the ideal should be of a modern and well-adapted village. Such an ideal village should be moreover something practical, a place where very imperfect human beings can live in all simplicity and realize both their virtues and vices in such a manner that life is worth living for the average man.

That does not make it easier because we will have to formulate our ideal with full recognition of the part played by the missions in the education of the people of New Guinea. This means that we are confronted with an imported religion whose leaders often seek to impose a code of behaviour that is, however commendable, highly unrealistic in a primitive New Guinea village. We cannot picture a village life that is at the same time in harmony with our ideal and with the imposition of codes demanded by the new religion. The possibilities of conflict in this field are numerous, even where it is granted that it is impossible to lead the ideal, moral life. We know these conflicts only too well from the difficulties arising round native feasting and dancing.

However, Christianity is more than a moral code. It is a religion, deeply convinced of human imperfection and sin. It knows what mercy means and knows when sin or folly is concerned. If ever there is a claim upon the church for mercy and charity towards human imperfection, such a claim might be made on behalf of these people who have lost so much and won so little. It is not the place here to enlarge upon this subject, but I feel confident that with these considerations in mind the following programme might be acceptable to the Missions, in whose hands such an important part of these people's education is laid.

The thing we want is a Papuan village belonging to some Christian

A group of young Papuans.

denomination, a village where the church has a function and where life is not seen, as it is today, as a burden or a problem, but as a gift which should be enjoyed as fully as possible. Such a village may not and cannot be an isolated spot, far from everything, but must be integrated into the whole of New Guinea; it must partake in the life of the island and of the world and it must do so in its own right and manner.

How are we to meet these demands? We are always inclined to think first of a new, better adapted system of education. Thus it might seem advisable to concentrate upon training in gardening and agriculture. We might even suggest—as I did once myself—that this trading might be a means to obtain a better menu in which tubers are replaced by cereals. But how are we going to do that? Children of school age, even those of twelve to fourteen years, are too small to do any serious work in agriculture. We may teach them how to plant flowers, but they cannot be taught how to clear a tract of new garden land. We cannot do much before they are physically full-grown, that is, before they have left school. That means that we are to start adult education among them. Then we may hope that they will apply the newly acquired techniques on behalf of their own household and economy. At least, if it pays.

But here again the odds are against us. In the first place such a policy requires the appointment of special teachers in agriculture in the 524 villages where we have village schools today. And such a measure would not pay, because we are up against the facts that the villages are too small, that in most areas the soil is rather poor, and that we have no cattle in New Guinea (or where we do have cattle the people are afraid of the animals and do not know how to manage them). That means that, whatever we are going to do in this field is going to require a tremendous lot of manual labour among people, who do not see the use of working hard for small profit. We will do well if we realize that manual labour does not pay in the world of today. If we are to educate these people to become agriculturalists we will have to procure them modern means, that is, modern machinery. That, however, is only possible in a relatively small number of areas. A very important part of the island is extremely swampy and tractors would not do there, at least not in such a way that their use might be expected to yield a reasonable profit.

Though mechanized agriculture might be profitable in a few areas—and a pilot project is now being undertaken—we will have to look for other means elsewhere. For this reason it will be wise to leave the people their sago, and in the long run also their tubers, where they can be grown with only a small effort of labour. Extra labour should be used almost exclusively for the planting of cash crops

As such we should not only think of maize and groundnuts, but of coconuts and cocoa as well. In other areas we should do better to refrain from promoting agriculture and make an attempt to develop forestry or fishery. But whatever we do or try, we are always up against the fact that these measures are no longer to be taken in the field of education only, but no less in the field of social and economic development. That means a reform and that reform must be the background for all future education. It can only be realized if we take our measures in the proper field, that is, in the field lying far beyond the competence of any department of education. Today our education fails because it cannot be applied to village life. That means that our work has been lop-sided; we have taken into account one aspect only and we have hoped, without being justified in doing so, that this would be enough to cause a fundamental change in these societies. But the change thus effected could not be more than the disorganization of the old life. It failed to constitute a new society. That can only be done by special measures of quite another character than those concerned with education in its proper sense. Such special measures must instead be extensive, because, if we ever want to succeed, we must conquer the broad feeling of inferiority, of not being able to partake, which now reigns among these people.

Economic and Social Development Needed

The only answer to this challenge is economic and social development. First of all the area should be opened by more traffic and communication. For the coastal areas we want small motor-vessels, manned by Papuan crews, shipping the copra and bringing the necessary merchandize. In other areas the people will have to

improve their own canoes. In agricultural districts we will want machinery for the tilling of cash crops and new means of transport for the produce. Everywhere we want some form of controlled co-operative society, which would stimulate and direct the economic activity of the village. Then and then only will these people be able to earn all those things they now covet in vain, without being compelled to submit to a superhuman effort in manual labour which does not pay and therefore does not appeal to them.

The point last mentioned, that it must appeal to them, is of special importance. It is good to teach them how to earn money, but it is no less important to teach them how to spend it. This, perhaps, is the most difficult of all, because we are inclined to force our own ideals of saving and thrift upon them, even though we know that we fall short ourselves in the fulfilment of these rules of ideal economic behaviour. In our own society we know quite well how to spend money. We do not know how they should do it, because their methods of spending money do not make sense to us. Thus we are persuaded to advocate the most plain boredom as the ideal economic behaviour among a people to whom richness means the capacity to make feasts and give presents. We are apt to forget that earning money and acquiring goods for the sake of possession is a vice, the vice of avarice. As a vice it is not even a pleasant one, and quite unsuited to be taught to people who prefer to indulge in generosity. Let them use the profit of their labour in their own way, that is, by feasting and dancing and to the embellishment of life. As long as they are going to earn that profit as members of a controlled co-operative society nobody need fear that investment of profit in capital goods will be made impossible, because that investment will be arranged by the co-operative society before dividends are paid to its members.

I know that many people will look upon this encouragement of feasting and dancing as a dangerous device, as, indeed, it is. Too often we see started, do not know how to stop. that Papuans, once dancing has objection that this leads to loose living and gives rise to many petty quarrels is certainly not unfounded. But I feel sure that all this cannot be an argument to prevent them from feasting and dancing if they want to. They have not only a right to their share of human freedom, but they must learn how to bear that freedom and that can only be done in freedom. We need not leave them without any kind of help or advice, but they should have the opportunity to fail. Things should not be forbidden because they may lead to mischief; mischief, if committed, should be punished wherever it falls within the scope of the penal code. And for the rest, they should have their opportunity either to behave or to misbehave. No society can exist without an opportunity for the realization of some human vices. We may try to create an ideal community, but we should not try to do so among these poor people. When we try to cut out every possible opportunity for iniquity, we are cutting out life itself. Many an Oceanic society is known which, by its declining birth-rate, gives ample testimony of the dangers of a policy, both of missions and of governments, which does not allow of mercy towards human imperfection.

Thus these people will commit many errors, and we will have to fear rather frequent cases of misdemeanour. But as long as we have not the courage to let them do something of their own accord they will never do anything. They must learn to lead a new life on their own responsibility. That will not make work among them any easier. But it may make them feel more free and confident, and that is what they need.

The programme is not an easy one. It embodies an enormous lot of difficulties. Some of them should be mentioned here. There is in the first place the financial difficulty. Starting a development programme demands a huge capital-investment in the form of vessels, tractors and other means of transport. Such an investment can only be granted if it pays. It is of no use to organize development programmes that do not pay, because, if engaged in promoting the welfare of island peoples.
one day or another, which is far worse than if nothing at all had been done. Every start, including a false start, is a promise which should be made good.

Secondly, this means that nothing can be done without thorough preparation and planning. Every small area here has its own special problems, difficulties and possibilities, which must be thoroughly looked into and then tested by pilot projects.

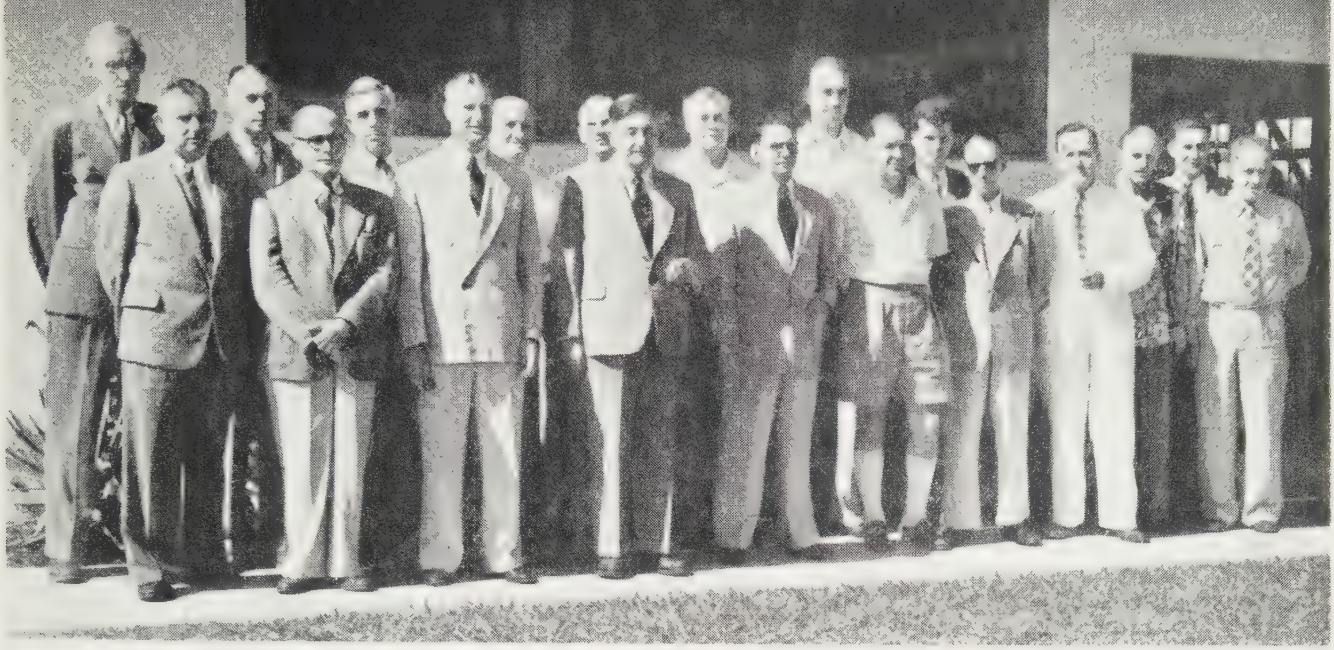
In the third place there is the problem of the necessary personnel. We need leaders, we want an organization, we need technicians, teachers and sailors. And we have none of them. These are some of the problems we are up against when we are going to do something, when we want to arrive somewhere in this most inhospitable country of the world, sparsely populated, swampy, unhealthy, vast, neither fertile nor sufficiently explored for its mineral resources. At the same time it is the only possible way of preventing our efforts in the field of education from becoming a total failure. If we neglect the reform of native society by adequate means, our schools will be useless. Village life will remain dull and without any bearing upon the real world of today. Progress, though fervently propagated, will be thwarted as it is today, because it will remain something that can only be achieved by some kind of magic.

Thus our task is clear enough. It is a vast one, but it can be fulfilled, even though it may take many long years to come.

Report on Pilot Community Development Project

The Commission's publishers, Oxford University Press, are now printing a report on a pilot community development project carried out under Commission auspices on the island of Moturiki in the Fiji Group.

The report is by Mr. Howard Hayden, then Director of Education in Fiji, who was chairman of the advisory group directing the project. Well-illustrated by numerous photographs and maps, Mr. Hayden's report will be of great interest to administrators, sociologists and others



Members of the Research Council for 1953, and principal officers of the Commission, photographed during the Council's fifth annual meeting held at Commission headquarters in June. (l. to r.)—Sir Brian Freeston, K.C.M.G., O.B.E. (Secretary-General), Mr. B. E. V. Parham, Mr. Homer L. Baker, Dr. A. Perk, Dr. A. H. J. Kroon, Dr. E. M. Ojala, Mr. W. C. Groves, Mr. H. E. Maude, Mr. D. R. A. Eden, Dr. Homer G. Barnett, Mr. J. E. Willoughby, Dr. Ch. J. Grader, Mr. H. H. Hickling, Mr. M. Legand, Dr. R. W. Maxwell, Mr. John Ryan (Deputy Secretary-General), Dr. J. T. Gunther, Col. P. Filippi, Dr. E. Massal.

Research Council Holds Fifth Annual Meeting

The fifth annual meeting of the Commission's expert advisory body, the Research Council, was held at its headquarters at Noumea, New Caledonia, from 8th to 17th June. The Chairman was Mr. D. R. A. Eden, General Manager of the New Zealand Reparation Estates in Western Samoa.

At this meeting, the work carried out by the Commission since the Research Council last met in June, 1952, was reviewed, and plans were made for its continuance during 1954. These will form the basis of discussions on its work programme by the Commission at its twelfth session, to be held at Noumea next October.

Following is a list of attendances at the meeting (names are in alphabetical order):

Participants

Mr. Homer L. Baker (vice Dean Knowles A. Ryerson): Director of Economic Affairs, Trust Territory of the Pacific Islands, Honolulu, Hawaii.

Dr. Homer G. Barnett: Professor of Anthropology, Department of Anthropology, University of Oregon, Eugene, Oregon, U.S.A.

Dr. H. J. T. Bijlmer (vice Dr. D. Metselaar): Director, Public Health Department, Hollandia, Netherlands New Guinea.

Mr. D. R. A. Eden: General Manager, New Zealand Reparation Estates, Apia, Western Samoa.

Col. P. Filippi: Director of Health and Hygiene, New Caledonia. Director of Army Medical Services in the Pacific.

Dr. Ch. J. Grader: Director, Bureau for Native Affairs, Hollandia, Netherlands New Guinea.

Mr. W. C. Groves: Director, Department of Education, Port Moresby, Papua and New Guinea.

Mr. J. C. R. Guiart: Ethnologist, French Institute of Oceania, Noumea, New Caledonia.

Dr. J. T. Gunther: Director, Department of Health, Port Moresby, Papua and New Guinea.

Mr. H. H. Hickling: Education Officer, Education Department, Rarotonga, Cook Islands.

Dr. A. H. J. Kroon: Executive Officer for Economic Development, South Pacific Commission.

Mr. M. Legand (vice Dr. F. Bugnicourt): Acting Director of the French Institute of Oceania, Noumea, New Caledonia.

Dr. T. C. Lonie: Director of Health, Health Department, Apia, Western Samoa.

Dr. E. Massal: Executive Officer for Health, South Pacific Commission.

Mr. H. E. Maude: Executive Officer for Social Development, South Pacific Commission.

Dr. R. W. D. Maxwell (vice Dr. J. M. Cruikshank): Deputy Director of Medical Services, Medical Department, Suva, Fiji.

Dr. E. M. Ojala: Deputy Chairman of the Research Council, South Pacific Commission.

Mr. B. E. V. Parham: Deputy Director of Agriculture, Department of Agriculture, Suva, Fiji.

Dr. A. Perk: Director of Economic Affairs, Hollandia, Netherlands New Guinea.

Reports on Social Anthropology

Two reports on research needs in social anthropology in the Pacific have just been published in book form for the Commission by its publishers, Oxford University Press. These are *Social Anthropology in Polynesia* by Dr. Felix M. Keesing, who is Professor of Anthropology at Stanford University, California, and a parallel study, *Social Anthropology in Melanesia*, by Dr. A. P. Elkin, Professor of Anthropology at the University of Sydney. (Reviews of both volumes by Dr. Cyril Belshaw appear elsewhere in this issue.– Editor.)

These two volumes on social anthropology form the second and third expert reports prepared for the Commission and published in book form under its auspices by Oxford University Press. The first was *Vocational Training in the South Pacific* by R. A. Derrick, Director of Technical Training, Fiji.

H.R.H. Prince Tu'ipelehake.

SOME CONFERENCE PERSONALITIES. This page: **H.R.H. Prince Tu'ipelehake, Governor of the Ha'apai Islands, who represented the Kingdom of Tonga, and Pa Ariki, Member of the Rarotonga Islands Council, who was alternate member for the Cook Islands.** Opposite page: **Mme. Terorotua Moua, delegate from French Oceania, and Hon. Mariota T. Tuiasosopo, President of the Senate of American Samoa, and leader of the delegation from that territory.** Overleaf: **Miss Tani Sisa, delegate from Papua.**

In this article an observer records some impressions of . . . .

The Second South Pacific Conference

By C. E. SAYERS*

AN outstanding impression left by the Second South Pacific Conference, held at Noumea late in April, is that the experiment begun at Nasinu, Fiji, three years ago has been fully justified.

I was a stranger to the South Pacific region, and its people, when first made aware of this Second Conference, and I approached its opening session with more than a little scepticism. The question uppermost in mind as I listened to the speeches on the opening day was: Can value come from any views these people may have to express on the subjects which will be put before them?

They were serious-looking people, earnest, quiet, as they took their places in the Conference hall. They were to maintain that serious air through out the twelve days of the meeting, and they were to provide, during that time, perhaps an unexpected answer to my unspoken question—and were to remove all scepticism.

The Conference *was* of value; views expressed by the delegates on the subjects placed before them, and upon which they were asked to make decisions, were of value.

In an article I wrote for an Australian newspaper a few days after the Conference began, I said: "In the past few days I have been watching a fascinating experiment—the shaping of the mind of a people brought together from great distances." Looking back over the past few weeks, and living far from the Conference place, I see no reason for changing that expression—"the shaping of the mind of a people."

Consider the people—the sixty or more delegates who had come from nineteen territories of the vast South Pacific region, and who spoke and acted for more than three million islanders.

They represented a variety of islanders — sophisticates, primitives, men and women whose contact with western civilization varied in the degree of their remoteness from modern economic and social trends. Few had no knowledge of the modern world; few were ignorant of the material benefits which we westerners boast come from close contact with the modern world. This could be sensed in all the discussions of the Conference.

It was a delight getting to know these people. They were sturdily courteous, unarrogantly conscious of their own race heritage; refreshingly polite in debate and personal behaviour; firmly certain that they were saying things in which they believed—and as firmly concerned to listen to opposing views with the same belief that the other fellow was also saying things in which he believed.

Observing the proceedings of this Conference—the presentation of set papers, the general discussions on the

Pa Ariki.

* Mr. C. E. Sayers is a well-known Australian journalist who has had extensive experience in Europe and South-East Asia. During the second World War he was Director-General of the Far Eastern Bureau, British Ministry of Information. From 1947 to 1950 he was London Editor of Australian Associated Press. In this article he records his views as those of an independent journalist attending the Conference.

Mme. Terorotua Moua.

points made in those papers, the argument for and against draft resolutions —the impression formed, slowly but certainly, that here were a people whose mind had been shaped in at least one direction—in a desire to work for the good of the South Pacific peoples as a whole.

It was as if they were saying: We, the people of the South Pacific, want things that will develop the region as a whole, that will better the economic and social position of the people as a whole, that will do everything possible to improve the health, the diet, the education of the people as a whole.

From this grew another impression —an impression even more positive than the feeling of corporate thinking induced, because it emerged from positive statement by many delegates —that in working for the good of the people as a whole, they wished them to play a more practical part in bringing that about than has been allowed them so far.

The delegates demonstrated their readiness for this by positive approach to the subjects listed for discussion, by the holdness of their debating, by the confident way they placed proposals before the Conference, by their common-sense, constructive views when draft resolutions were presented for consideration.

In these ways was demonstrated the unspoken belief of the delegates that they were able, and willing, to play a greater part in the conduct of future meetings of the Conference. Few who sat in the meeting place as observers would deny that belief.

Economic Problems The Chief Concern

Consider the subjects placed before these people. The three main groups listed in the agenda concerned economic development, social development and health. As discussion developed it became apparent that the chief concern of the delegates was with economic problems, and economic advancement. This can be understood, perhaps, when the impact of recent happenings on the South Pacific peoples and their way of life is remembered—in particular, the war in the Pacific.

One sensed a little impatience in the approach of some delegates to the consideration of economic questions; of matters affecting the material conditions of their people.

Yet the overwhelming sense of the Conference on these matters—marketing, conservation of resources, diversity of subsistence and cash crops, the development of co-operative ventures, and the like—was that the first step should be a region-wide investigation with a view to planning for the future of the whole region.

It was from observing this community spirit, this desire to move forward as one people, that I formed an admiration for the common sense of the delegates, and saw in it a reflection of the people they represented. Some of them might have appeared impatient to get on with things that could improve living standards and better material conditions. Yet when put to the test even the most impatient-seeming amongst the delegates agreed that the means would have to be inquired into before an end could be decided, let alone achieved.

That was an encouraging thing, and an augury for acceptance by the people of the South Pacific of development at a pace that could be measured against needs, and applied to achieve forseeable results by well-ordered, carefully-mapped stages.

Hon. Mariota T. Tuiasosopo.

Needs exist: the discussions left no doubt about that. Those needs will have to be inquired into: the general principle of region-wide study, research and blue-printing, can be accepted. It will not be a quick inquiry; the area of inquiry, and the problems, are too wide for that. It will not be an easy matter to apply the results over the whole region quickly. One got the impression that these things were realised by the delegates; an impression that came chiefly from suggestions for basic, over-all inquiry before any effort should be made to decide action.

People's Desire For Participation

Another encouraging thing was the desire—sincerely expressed in debate, adequately expressed in recommendation—for the peoples' participation in measures recommended for their welfare.

Health education is a case in point. Health has made great advances in the South Pacific in recent years. Health services are being developed more and more, medical and nursing services expanded. Yet a great deal remains to be done, especially in the field of educating the people in health matters.

Delegates showed time and again that they realise this; they also showed that they realise the islanders themselves can do much to improve sanita-

Miss Tani Sisa.

tion of villages, to accept modern medicine and modern treatment for diseases, and as means of preventing diseases. But they must be taught to accept those things, and to assist in carrying out health measures.

Thus the Conference, in recommending that health propaganda be made simple in language, also urged that everything possible should be done to encourage the people themselves to apply the lessons contained in that propaganda. Through children, as an example. On this point the Conference said, in effect: Give the school children simple instruction in personal hygiene so that they may apply the results in their own homes, thus demonstrating them to their elders.

One also felt this desire for closer participation of the people in the carrying out of measures designed for their welfare in discussions about the place of women in the community.

Three women were among the delegates, and they earned admiration for their forceful persuasive arguing on that subject, and on others that had to do with the welfare of women and children.

Women, they said, had a definite and important place in the community, not alone in the home; they could play a useful part in community life by being encouraged to join clubs, by being taught to apply health lessons in the home and in the village, by being given a greater voice in community affairs.

Acceptance of the general principle that women have, indeed, an important part to play in community life defied tradition—and made history.

There was no support for the delegate who said it was woman's place to provide for the comfort of her lord and master, who hunted for the family food and defended the home. Thus, tradition was defied.

There was support for the hope that more women delegates would be among the members of future sessions of the Conference, and no dissent from suggestions that a conference of South Pacific women be held at some future time. Thus, we saw history made.

Results of the Conference

Consider the results of the Conference. Can they be summed up as tangible things? Their value is admitted, yet making, even suggesting, an answer to that question is not easy. There are so many limitations to the powers of the Conference; even without limitations many recommendations and suggestions of the Conference could not possibly be dealt with before the Third Conference is held.

Every delegate at Noumea fully realized the limitations within which the Conference can operate; one wonders if every delegate recognized as fully the strains put upon those limitations by the spate of recommendation that resulted from the discussions.

Perhaps they did; if that be so, they should be as commendatory of the South Pacific Commission, its experts and secretariat, as they were about the results that have come so far from the recommendations of the First Conference.

I had no place at the Noumea Conference; I was no more than an observer—"a chiel," to quote Bobbie Burns, "takin' notes." I came away from it full of admiration for the people who organized it, for the people who formed it, for their approach to the problems discussed, for their debating power and their sweet reasonableness.

And I came away fully convinced of the value of the Conference as a regional forum in international affairs, and holding the belief that the test of Noumea entitles it to permanence on the international stage.

But I have reservation about the paper results of the Conference. I feel that too much was attempted, that the pace set was too fast, that too many paper results came from it—and that little will be possible to justify them between now and the holding of the Third Conference—in two years time if the desire of the Conference is agreed; not less than three years in the terms of the Agreement setting up the South Pacific Commission.

In the brief time I was at Noumea I saw something of the work that has been done since the Nasinu Conference three years ago. But that work has only touched the surface of the development and welfare problems of the South Pacific region. How much more deeply the approach to those problems can go before the Third

Coronation Message

During the Conference, the following resolution relating to the Coronation of Her Majesty Queen Elizabeth II on 2nd June was carried unanimously. (The resolution was proposed by a delegate from American Samoa and seconded by a representative of French Oceania.)

"The Conference, on the occasion of the Coronation of Her Majesty Elizabeth II, Queen of the United Kingdom of Great Britain and Northern Ireland, and Head of the Commonwealth, requests that the Commission, through correct diplomatic channels, communicate the heartfelt wishes of all the Pacific peoples for a long and prosperous reign. Recognising the contribution which Her Majesty's Government has made to the progress of the South Pacific area, we join together in assuring Her Majesty of our appreciation of the United Kingdom's role in our South Pacific family. We look forward with great expectations to the many years of her happy reign."

The following acknowledgement was subsequently received by the Secretary-General from Her Majesty's Consul in Noumea:

"I have been requested by Her Majesty's Principal Secretary of State for Foreign Affairs, London, to convey to you the sincere thanks of Her Majesty The Queen for the kind sentiments embodied in the terms of the Resolution by the Second South Pacific Conference expressing good wishes to The Queen on Her Majesty's Coronation."

SECOND SOUTH PACIFIC CONFERENCE

Representatives from the South Pacific Territories

NETHERLANDS NEW GUINEA

Delegates

Mr. MARCUS KAISIEPO, Official of the Information and Broadcasting Service, Hollandia.
Mr. W. INURY, School Inspector, Hollandia.

Advisers

Rev. I. S. KIJNE, Field Director of New Guinea Missions of the Nederlandse Hervormde Kerk (Dutch Reformed Church).
Dr. J. V. de BRUYN, Assistant Resident, Bureau of Native Affairs, Hollandia.

PAPUA

Delegates

Mr. PAULUS AREK, Teacher on staff of Sogeri Education Centre.
Miss TANI SISA, stationed at Saiho, near Mount Lamington, engaged in rehabilitation work.

Alternates

Mr. TIMEAUS SAMBURA, Chief Instructor at Saiho Medical Orderly School.
Mr. ELLIOTT ELIJAH, M.B.E., Co-operative Inspector, Bougainville.

AUSTRALIAN NEW GUINEA

Delegates

Mr. ADVENT TAROSI, B.E.M., Senior Teacher with Department of Education.
Mr. WAIAU AHNON, Member of the Rabaul Town Advisory Council and President of the Kambiu Club, Rabaul.

Alternates

Mr. LEO TAKAPAN, Paramount Luluai of his District.
Mr. NASON TOKIALA, Chairman of Nanga Nanga Village Council. Responsible for the development of the Tapipip Cacao Project.

Advisers

Mr. H. L. R. NIALL, M.B.E., Senior District Commissioner.
Miss B. A. McLACHLAN, Officer-in-Charge, Female Education Division, Department of Education.
Mr. R. S. CARNE, Senior Agricultural Officer for Central Highlands.
Mr. R. THOMSON, Social Welfare Officer in the Administration.

BRITISH SOLOMON ISLANDS

Delegates

Sgt. SIMON SIAPU, Member of Solomon Islands Armed Constabulary.
Mr. GIDEON ZOLEVEKE, Assistant Medical Practitioner, Medical Department.

Adviser

Mr. J. L. BERGELIN, Inspector of Labour.

NEW HEBRIDES

Delegate (British)

Mr. PHILIP ILO, Assistant Medical Practitioner.

Delegate (French)

Mr. KALSAUTU, Chief of the Mele Village, Efate Island.

NEW CALEDONIA

Delegates

Mr. KOWI BOUILLANT, High Chief of the Poyes Tribe. Member of the General Council of New Caledonia.
Mr. ROCK PIDJOT, Chief of the Conception Tribe. Member of the General Council of New Caledonia.

Adviser

Mr. HENRI POYET, Head of the Department of Native Affairs.

NAURU

Delegate

Mr. JAMES ATEGAN BOP, Councillor and Treasurer Nauru Local Government Council.

Adviser

Mr. J. N. SNELL, Accountant in the Administration.

GILBERT AND ELLICE ISLANDS

Delegates (Gilbert Islands)

Mr. TUTU TEKANENE, B.E.M., Senior Assistant Medical Practitioner in the Medical Department.
Mr. MONOKOA KOTIKU, Clerk, British Phosphate Commission.

Delegates (Ellice Islands)

Mr. FALANI PASEFIKA, Clerk and Customs Officer in the Treasury.
Mr. KAISAMI MELITIANA, Headmaster.

Adviser

Mr. R. G. ROBERTS, Administrative Officer.

FIJI

Delegates

Hon. JOELI KETE RAVAI, O.B.E., Member of the Legislative Council.
Hon. T. R. SHARMA, Member of the Legislative Council. Barrister and Solicitor to the Supreme Court of Fiji.

Alternates

Hon. RATU TIALE VUIYASAWA, Chief Administrator, Province of Cakandrove.
Hon. B. M. JANNIF, Nominated member of the Legislative Council.

KINGDOM OF TONGA

Delegate

H.R.H. Prince TU'IPELHAKE, Governor of Ha'apai (central group of islands in the Kingdom).

Adviser

Mr. W. STRAATMANS, Senior Agricultural Officer, Government of Tonga.

WESTERN SAMOA

Delegates

Hon. GATOLOAI PESETA SIA, Chairman of Fono of Faipule.
Hon. TUALAULELEI, Member of Legislative Assembly.

Advisers

Hon. MAULAIVAO SUNU, Member of the Fono of Faipule.
Hon. TE'O LEUTELE, Member of the Legislative Assembly.

Secretary/Interpreter

Mr. LUAFATASAGA KALAPU, Chief Translator and Interpreter in the Samoan Affairs Department.

AMERICAN SAMOA

Delegates

Hon. MARIOTA T. TUIASOSOPO, President of the Senate.
Hon. SALOFI AUMOEGALOGO, Speaker of the House.

Alternate

Hon. TUFELE FAIAOGA, Paramount Chief.

Adviser

Mr. JOHN C. COOL, Staff Anthropologist.

COOK ISLANDS

Delegates

Mr. WILLIAM P. BROWNE, Member of the Rarotonga Islands Council.
Mr. TIRI TREGO, Chief Administration Clerk, Mangaia.

Alternates

PA ARIKI, Member of the Rarotonga Islands Council.
Mr. J. W. W. GRAHAM, Resident Agent, Mangaia.

NIUE

Delegate

Councillor H. ANAKI, Island Council member for Tamakautoga.

Adviser

Mr. LESLIE REX, School teacher and official interpreter.

FRENCH OCEANIA

Delegates

Mr. JEAN MILLAUD, Former President of the French Oceania Representative Assembly.
Mme. TEROROTUA MOUA, Teacher.

Alternate

Mr. ANTELME BUILLARD, Member of the staff of the Bank of Indo-China.

GUAM

Delegates

Mr. MANUEL F. L. GUERRERO, Government Administrator.
Mr. BALTAZAR J. BORDALLO, Former President of the House of Council, Guam Congress. Member of the Legislature.

TRUST TERRITORY OF THE PACIFIC ISLANDS

Delegates

Mr. ROMAN TMETUCHL, Administrative Assistant. Member of the Palau Congress.
Mr. IGNACIO V. BENEAVENTE, Secretary of the Congress of Saipan. Associate Judge of the Saipan District Council.

Adviser

Dr. SAUL RIESENBERG, Staff Anthropologist.

(Continued overleaf)

CONFERENCE ATTENDANCES (ctd.)

Representatives from Official and Non Official Institutions

Mr. F. R. BRAY, International Labour Office.

Mr. HAROLD J. COOLIDGE, Pacific Science Board of the National Academy of Sciences—National Research Council of the United States of America. Council—Pacific Science Association.

Rev. V. W. COOMBES, National Missionary Council, Australia.

Prof. J. W. DAVIDSON, Australian National University.

Dr. J. C. R. GUIART, French Institute of Oceania.

Rev. A. G. HORWELL, National Missionary Council, New Zealand.

Rev. I. S. KIJNE, Observer for United Netherlands Missions, Netherlands New Guinea; also Adviser Netherlands New Guinea Delegation.

Mr. B. KRIGER, Observer for Royal Institute for the Tropics, Amsterdam. Netherlands Commissioner for the South Pacific Commission.

Dr. ATHOL J. PATTERSON, Regional Public Health Administrator (Western Pacific), World Health Organization.

Rev. Father JOHN SOURY-LAVERGNE, Roman Catholic Missions and Organizations in the South Pacific.

Mr. LYNFORD KEYES, Public Health Education Adviser to the Regional Office of the World Health Organization, Manila.

Other Attendances

Commissioners of the South Pacific Commission, alternates and advisers nominated by member Governments attended as observers.

Impressions of the Second South Pacific Conference

(Continued from page 26)

Conference cannot be predicted: there are too many factors involved.

Harking back: I met at Noumea observers who attended the Nasinu Conference. They were in agreement that the First Conference was a gamble; that it succeeded was, they were convinced, because of the careful guidance of the delegates. They were equally convinced that its success was due so much to the confidence created among the delegates—and the comradeship.

These observers said of Noumea that the more positive tone of the delegates, their greater confidence in discussion and their self-esteem, were more encouraging than might have been expected, even allowing for the encouragement Nasinu had given to the representatives of the islanders.

I can only speak about Noumea, and of it I have said, and repeat, there I watched the mind of a people being shaped.

I have one other reservation: it was a good shape, it can be moulded for the well-being of a fine people by continued careful guidance. It could be distorted by attempting too much, or too little, in order to try for results too quickly.

Pacific Copra Survey

The copra industry in French Oceania is now being investigated by the Commission's coconut officer, Mr. W. V. D. Pieris, who left Noumea for Tahiti on 19th June.

French Oceania is the eighth Pacific territory to be visited by Mr. Pieris in the past year in his investigations of the copra industry for the Commission. Mr. Pieris has been impressed with the importance of the copra storage problem in the area. Each year producers suffer heavy losses, due to shrinkage and deterioration of copra through mould and insect infestation. Mr. Pieris considers that more attention should be given to the development of a well-ventilated, insect-proof copra store of cheap construction which can be easily sealed for fumigation purposes.

Commission Technical Papers Issued This Year

Reports issued in the Commission's Technical Paper series this year include a series of five (Nos. 36-40 inclusive) prepared for the Commission by Mr. D. H. Urquhart on cocoa and coffee growing in the area. These are:

No. 36—*Cocoa Growing in Fiji Islands.*

" **37**—*Cocoa Growing in Netherlands New Guinea.*

" **38**—*Coffee Growing in New Caledonia.*

" **39**—*Cocoa Growing in Western Samoa.*

" **40**—*Cocoa Growing in New Hebrides.*

Other papers issued subsequently are:

No. 41—*Social Problems of Non-Maori Polynesians in New Zealand,* by Rev. R. L. Challis.

" **42**—*The Co-operative Movement in Papua and New Guinea,* prepared by the Registry of Co-operative Societies, Port Moresby.

" **44**—*Research in Queensland in Tropical Plant and Animal Industries,* by J. Barrau.

" **43**—*The Use of Vernacular Languages as Vehicles of Instruction,* by C. J. Platten.

Copies of the above Technical Papers are obtainable, price 2/- sterling each, post free by surface mail, either from the Secretary-General, South Pacific Commission, Noumea, New Caledonia, or South Pacific Commission, G.P.O. Box 5254, Sydney, Australia.

Dry-Land Rice Experiments in Papua and New Guinea

Cross breeding and selection work to produce a dry-land variety of rice suitable for mechanized cultivation and harvesting is being undertaken in the Mekeo District in Papua by the Department of Agriculture, Stock and Fisheries.

Many of the Rural Progress Societies sponsored by the administration in the Mekeo District, at Amele (near Madang), and at Dagua and Maprik (Sepik District), are based on the planting of dry-land rice in village gardens.

Cultivation and harvesting are being mechanized in the Mekeo area. Many of the societies already own and operate mechanical rice mills, while more are being purchased and installed.

Forestry In Western Samoa

. . . A review by

A. H. KROON*

Forest clearing on Upolu, invaded by secondary species.

UNDER the title *Forestry in Western Samoa* the Government of Western Samoa has published, in one volume, a report by Colin Marshall, and a supplementary report by T. S. Thompson.

In the introduction it is rightly noted that the scope of the report is considerably wider than that of a technical report on the forests of Western Samoa, and for that reason it is considered that authorities in other territories of the South Pacific will find it of interest.

Mr. Marshall advises the establishment of a land-use plan prepared by experts, "for it is on the best use of the natural resources of a country that a high standard of living for all the people, all the time, is based. Faulty land use may produce a temporary false flush of prosperity, but at the cost of misery, penury, starvation, and death for future generations."

Adequate Maps Essential

It is stated that before any plan can be made, it is imperative there should be adequate maps. Preparation of an aerial photographic mosaic is recommended, but only if accompanied by ground control and completed by the production of a topographical map. It is considered a land-use plan should indicate:—

(a) Which land must, in the vital interests of the people of Samoa, remain forever under forest to prevent erosion on water-supply catchment areas, hydro-electric catchment areas, or very steep erodable land;

(b) which land may either be cultivated under strict anti-erosion control methods only, or may be used for controlled shifting cultivation on the long-term tree-fallow system;

(c) which areas are grazing lands; and

(d) which are arable farming areas.

It is furthermore urged that more varied meteorological information should be obtained.

A draft Forest Ordinance is included as an appendix.

Supplementary Report

In the *Supplementary Report on Forestry in Western Samoa,* Mr. Thompson gives a valuable description of the forests and of logging operations.

In the introductory part of his recommendations he stresses the vital importance of the correct use of land in a territory where the population is expected to double itself in the next thirty years:

> In the early stages of development a country may make progress without a plan, and yet without serious consequences. Soil is fertile, or moderately so; and there is an apparently limitless area of land to exploit. Such a country is Western Samoa. But with a population expected to increase during the next thirty years from the present figure of 80,000 to double that figure, with

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Forest margin invaded by climbing vines.

expanding and costly education and health services to maintain, with a growing demand for commodities from overseas to satisfy, the Territory is reaching a point where living standards can only be raised, or even sustained at present levels, if its economy is planned and the sources of its wealth conserved.

Agriculture is the basis of its prosperity, and the problems of land utilization are therefore of paramount importance. The Pacific can show many examples of land wrongly exploited, and now ruined. The recommendations which follow, some of a general nature and some more particularly concerned with forestry, are a plea for prompt action in Western Samoa to prevent such a catastrophe.

In his conclusion Mr. Thompson states:

One fact stands out prominently: before forestry can function effectively and take its proper place in the economy of Western Samoa, very considerable further studies of land-use problems must be made. If the report has made this one fact clear, it will have achieved its purpose.

A map and twelve photographs give visual aid to this noteworthy work.

Many of the remarks in both reports seem to be applicable to conditions in other South Pacific territories.

Forestry in Western Samoa: A report by Colin Marshall, M.A. (Oxon), British Colonial Forest Service, with a supplementary report by T. S. Thompson, B.A. For (Oxon), New Zealand Forest Service, 1950. 64 p., 12 plates, map. Government Printer, Wellington, for the Government of Western Samoa, 1953.

The accompanying photographs, which appear in the report under review, were reproduced by courtesy of the Department of Island Territories, Wellington.

Practical Advice on Coconut Cultivation

A series of leaflets on coconut cultivation and plantation management is being prepared by Mr. W. V. D. Pieris, copra specialist to the South Pacific Commission. They will be practical, well-illustrated, and written in non-technical language.

Mr. Pieris, who was Deputy Director of the Ceylon Coconut Research Scheme for many years, was appointed to his present post with the Commission a year ago. Since then he has investigated coconut production in in Fiji, Western Samoa, American Samoa, the Lower Cook Islands, Lifou and Uvea of the Loyalty Group, a part of New Caledonia, Guam, the Eastern Carolines and Marshalls. He left Commission headquarters on 19th June for French Oceania to investigate the industry there.

Mr. Pieris' first-hand knowledge of the problems of coconut planters in the Pacific, combined with the results of his extensive practical experience of coconut cultivation Ceylon, will be embodied in the leaflets he is now preparing. It is anticipated that the first of the series will be published towards the end of the year.

Shifting cultivation on Savai'i; taro planting on left, second growth on right.

Anthropology In Oceania

A review of two reports on research needs in social anthropology in the Pacific, just published for the Commission by Oxford University Press.

By C. S. BELSHAW*

A. P. Elkin: *Social Anthropology in Melanesia.* F. M. Keesing: *Social Anthropology in Polynesia.* Both issued under the auspices of the South Pacific Commission. Melbourne: Oxford University Press. 1953. Each: 27/6 in Australia. xiii + 166 pp. and x + 126 pp. respectively.

AMONG the most critical decisions that have to be made by any field worker in anthropology are where to go, what research problem to tackle, and whether place and problem fit together. Up to date, anthropologists in the Pacific area have had to rely very much on the memories of colleagues as to the suitability of areas for their research, upon the advice of settlers and officials who cannot usually be expected to have an accurate appreciation of research requirements, and upon sheer chance. Gradually this situation is improving. Research centres such as the Australian National University and the University of Hawaii, and the experience being built up by the Social Development Section of the South Pacific Commission, provide a continuity of area research knowledge upon which to draw.

The two reviews of research by Professors Elkin and Keesing assist further by providing a concise summary of the state of research to 1950, and by suggesting areas and problems that would best repay study. Already, the draft reports on which these volumes are based have proved to be invaluable sources of reference material for students, and extremely useful guides for research workers preparing for field study. That this should be so needs no underlining when the thorough methods and long experience of the two authors is remembered.

Such, however, is not the only value of the books under review, nor in fact their primary purpose. If it were, the professional anthropologist would be justified in making the obvious criticism that problems of "pure theory" have not been posed. The books have been written with administrative and Commission purposes in mind; the object has been to discover what kind of research is needed, and where it should be carried out, if it is to be of immediate practical benefit in assisting public bodies to develop Oceanic societies along more modern lines. In this the authors have succeeded, though not evenly.

Professor Elkin has arranged his material according to cultural and administrative districts, covering the area from Netherlands New Guinea to New Caledonia. For each district he assesses the material and gives a bibliography which is most extensive and complete for Australian Papua and New Guinea, the British Solomons, and the New Hebrides. Regrettably, the rich and promising field of New Caledonia and the Loyalty Islands is dismissed in two pages—a common defect of English-language reviews of the Pacific scene. In this instance, there has resulted the omission from the bibliography of a number of works of significance to Melanesian ethnography in general — notably Leenhardt's *Do Kamo* and Rau's *Institutions et coutumes canaques.*

Although a geographical arrangement such as this loses in analytical power, it has a compensating advantage. Administrative officers, missionaries, and others who are interested in particular districts may see at a glance just what the state of social knowledge is for their area, where they should turn for information, and how they could most profitably use their time if they were inclined to do supplementary work. From my own experience I can vouch for the value of such a compilation to officials, and I venture to predict that every keen officer, particularly in Australian New Guinea, will have the book in his baggage before long. Most notably, there will then arise a demand for the building up of libraries in appropriate centres which can supply the references on request.

Professor Keesing has adopted quite a different arrangement for Polynesia and Fiji. Here the area interest is centred on a bibliographical appendix. The text is highly analytical, discussing the Commission's work programme in health, social, and economic development in the light of current conditions, and giving full references to the anthropological literature that bears on each problem. The discussion is in itself a useful summary of Pacific Island conditions, and highlights the value of anthropological research in making the road easier for welfare programmes. Of special importance for the official or missionary interested but untrained in social research, it calls attention to numerous concepts of modern anthropology which refine or refute popular impressions as to the nature of underdeveloped societies. Thus on one occasion the writer draws attention to the characterization of Polynesian society as "communal" or "collective" in its production and distribution arrangements—a concept that anthropologists have long shown to be quite false, but which still survives today in many influential lay circles. A measure of the validity of Professor Keesing's analysis is that it is almost equally applicable to the Melanesian field: officials in New Guinea would find that the problems pointed up for Eastern Oceania are just as relevant in the West.

Professor Keesing concludes his text with a statement of no less than 107 research needs, arranged in order of priority. I have the impression that these are research headings rather than field work problems, and that in the process of re-defining them to suit research needs, workers would find it more practical to bring some of them together and investigate them

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simultaneously rather than as separate topics.

The original drafts of both publications were prepared by 1950, and the present texts stand much as they did then. It is interesting to note how they have stood up to the passage of three years of research. Professor Keesing has been fortunate; very little work has been published from Polynesia in this time, though several specialists are now or have recently been in the field, and the *American Indians in the Pacific* of Heyerdahl is now causing controversy.

Professor Elkin has been less fortunate. Two of the main research centres of the Pacific, the Australian National University and his own University of Sydney, have tended to concentrate their work in Melanesia, particularly in the pioneering of ethnography in the Highland areas of New Guinea. The text has been brought as up-to-date as possible to 1952, but the revision has not been complete, and the numerous projects now in hand will rapidly alter priorities and our conception of research needs. Publication is being scattered over an ever-widening field, not only in *Oceania* but also in American quarterlies and the *Journal de la Société des Océanistes*. Small items of interest occasionally appear in administrative journals, such as *Corona* and *South Pacific*. New series of monographs dealing predominantly with Melanesia are now appearing, particularly from the *Institut Français d'Océanie*, and (as projected) from the Australian National University. Much of the research now carried on will probably remain buried in theses.

All this makes the problem of revision of this research report, perhaps every five or ten years, all the more difficult and necessary. It is to be hoped that the technique of publication will permit this to be done, or that means will be found of issuing supplementary reports. It is also to be hoped that more workers will be attracted to the field of Polynesia, so that the healthy need for revision becomes apparent there as well.

Professor Keesing speaks, at one point, of the requirement of "processing" the materials obtained by academic anthropologists before they can be used by welfare workers. Given the work already done in the area, this is undoubtedly true. Few anthropologists have been interested specifically in culture change in Oceania, and of those who have recorded adapting cultures, still fewer have seen the value of relating their findings specifically to administrative welfare problems. In one way, this is not surprising. Field officials and missionaries have occassionally attempted to cajole workers into these fields, they have demanded to know why they should put themselves out to support on the ground the work of "pure theorists," and they have objected that short-term workers claim to know more about custom than settlers who have lived with the people all their lives. Professor Keesing's book is the practical refutation of this view. But when anthropologists have dared to comment on policy or to make recommendations, they have been accused equally vigorously, and often by the same people, of lack of realism, of becoming unscientific, and of being subversive because inevitably the "established" pattern is challenged. It is no wonder that some anthropologists are sensitive, perhaps supersensitive, to meddling with practical issues, and that the quality and quantity of such work is so poor in relation to needs.

The problem, of course, goes deeper than this rather personal issue. There has been a wide, and in my view ill-founded, belief among anthropologists that field work unrelated to practical issues is "pure theory" of a scientific kind, contrasting with other kinds of research. Some time ago, in an unpublished review of research in East Africa, Dr. W. E. H. Stanner made the point that enquiries do not lose their objectivity or scientific value merely because they are oriented to practical problems of administrative interest. Further, in other social sciences, such as economics, many theoretical concepts of basic significance have been formulated as a direct result of stimulation derived from policy questions. Similarly, in anthropology, complexes such as the cargo cult have received publicity and then been studied because they have presented administrative problems; while much research on marriage exchanges and so forth has been built up as a reaction against popular theories that these represented the "degradation of women" or a "financial" purchase. This basic interaction of popular thought and experience upon theoretical discussion is often not explicitly recognized by anthropologists, and neither Professor Keesing nor Professor Elkin has emphasized it. Yet the emphasis is needed if research workers are to be drawn into fields that are of urgent significance for human development, and not become more and more imprisoned in ivory towers.

Both writers underline the need for anthropologists to be appointed to Government staffs, and Professor Elkin has suggested that Missions appoint anthropologists. It is gratifying to know that the Administration of Papua and New Guinea has made one appointment to its establishment of two, that there is an active ethnologist with the *Institut Français d'Océanie*, and that the Society of the Divine Word in New Guinea is organising anthropological research under the direction of Father L. J. Luzbetak. Officials, particularly in Netherlands New Guinea and in the British colonies, occasionally find the time to conduct research and publish it But much more needs to be done. Briefly, the needs are for system and co-ordination.

System can only be achieved through adequate training of officials, their awareness of the need, the allocation of funds, and the use of native assistants. Much of the basic data that we need for the Pacific should not be gathered through the work of anthropologists at all, but through routine systematic surveys. Household budgets, sample agricultural statistics, land tenure surveys, urban and rural sociological censuses, population marriage and re-marriage figures, are merely instances of information which no modern government can afford to ignore. It is too haphazard to depend on infrequent visits of anthropologists to achieve this, and much could be done with properly-oriented administrative officers with assistants drawn from the local population.

But the fact of the matter is that, outside perhaps New Guinea, New Caledonia, and Fiji, territorial governments and the missionary societies that operate in their jurisdictions are too small to organize such work adequately or to employ the specialists to help them do so. It is here that Professor Elkin's suggestion that the Commission employ anthropologists is of special value. There is a vital need to keep in touch with research in

(Continued on page 43)

The Copra Industry in the Trust Territory of the Pacific Islands

By W. SCOTT WILSON

Department of Economic Affairs, Trust Territory of the Pacific Islands (under United States Administration).

Husking coconuts on the Matalanim copra plantation, on the island of Ponape.
—Photo by H. L. Baker

COPRA has long been the most important income producer for the Micronesians. Although the Japanese produced crops of sugar cane in the Marianas and developed the fisheries of the territory to the point where copra ranked third in importance as an export of the area, copra remained the most important money crop to the Micronesians. This was because very few of them were employed in either the sugar industry or the fishing industry, while the bulk of copra production was carried on by islanders.

Copra Production

To produce copra, the coconuts are first husked, the nuts broken open, and the meat dried for a time in the half-shell until it becomes easy to remove. The meat is then cut up and dried for a longer period, either in the sun, in sheds by heat from a fire, or in special copra dryers. The finished copra is graded according to colour, oil content, and maturity. Three grades are recognized, and prices are paid according to the grade. Sun-dried copra is the type that is preferred, although there is some artificially-dried copra produced in the Trust Territory.

Production Variations

Production of copra in the Trust Territory, especially in the Western Carolines and the Marianas, has been subject to natural dangers of great effect. In the 1900's production in the Marianas and Western Carolines suffered from the devastating effects of typhoons and the equally-devastating effects of an insect that was introduced from the Philippines. At present, the production of copra in the Western Carolines is suffering from the introduction during the war of the rhinoceros beetle, which breeds in the foliage of the growing coconut trees. Introduction of a predatory wasp has not yet been successful in controlling the rhinoceros beetle, and considerable work is being done to clean up the breeding places of the beetle in the war-torn areas. The spread of the beetle is being guarded against by quarantine measures. Other pests are being kept in check by natural enemies and by constant vigilance.

Despite the destruction of bearing coconut trees during the war, and the ravages of the rhinoceros beetle, copra production (Table I) is on the upswing, and compares favourably with production achieved during the Japanese period. The Japanese paid subsidies of 20 yen per hectare for new plantings of coconut trees 100 to 200 trees to the hectare, and 10 yen per hectare in cases of improvement or clearing of palm forests containing 100 to 200 trees per hectare. In 1932, they added a subsidy of one-quarter of the price of establishing a new copra dryer.

The Government of the Trust Territory has not subsidized the production of copra (except at the Matalanim Plantation at Ponape), and the recovery of the copra industry is due to the initiative of the producers, who have been encouraged by the fair prices they receive from the Island Trading Company. Export value of copra is attached as Table II. A comparison of the areas of palm forests

in 1923 and 1938 is attached as Table III.

Future Copra Production

Production in the future is, of course, difficult to predict. Indications are, however, that there will be a continued rise in production if prices can be maintained somewhere near present levels. Some of the factors which will affect yield and production in the future are:

(1) Application of scientific techniques to the improvement of the coconut palms, such as selection of planting stock for early maturity and increased yields, and experimentation in the use of fertilizers. Experiments conducted elsewhere in the Pacific on palm selection have resulted in a doubling of the yield of copra per acre.

(2) Depredations by the rhinoceros beetle in the Palau District have seriously affected production there. If the beetle cannot be brought under control there, and if it should spread to the other areas, the industry could be ruined. However, present indications are that the beetle problem will not reach serious proportions in other areas of the territory.

(3) Technological improvements in the production of edible coconut oil which would not be applicable in the Trust Territory because of geographic factors could have a seriously depressing effect upon the demand for Trust Territory copra. An example of such an improvement is the Robledano-Luzuriaga process for the extraction of oil and protein from fresh coconut meat. Increase of the use of detergents could similarly depress the demand for copra.

Despite the factors which may cause a lessening of demand for copra, the coconut palm, due to its many uses, must continue to occupy a very important part in the economy of the Trust Territory, both as a subsistence crop and for cash income.

Sydney Office of Commission

The Sydney (city) office of the Commission, hitherto located at 14 Martin Place, is now in Dalton House, 115 Pitt Street (telephone BW 3409).

TABLE I

Production of Copra, Trust Territory of the Pacific Islands
Metric Tons

Fiscal Year.	*Total.*	*Marshalls.*	*Ponape.*	*Truk.*	*Yap.*	*Palau.*	*Saipan.*
Late 1890's	5,150	3,000	850 (includes Truk)		1,000 (includes Palau)		300
1906	4,052	—	—	—	—	—	—
1913	5,818	—	—	—	—	—	—
1923	7,888	3,976	2,090	1,203	226	116	277
1924	8,360	4,556	1,548	1,529	255	129	343
1925	9,790	5,446	1,720	1,616	338	239	431
1929	9,777	—	—	—	—	—	—
1930	12,493	—	—	—	—	—	—
1931	11,226	—	—	—	—	—	—
1932	9,529	—	—	—	—	—	—
1938*	14,939	6,389	3,517	2,458	1,090	600	884
1948	7,811	3,181	2,160	1,710	642 (includes Palau)		118
1949	7,354	3,164	2,365	1,316	436 (includes Palau)		73
1950	8,820	3,496	2,857	1,778	518 (includes Palau)		171
1951	10,531	—	—	—	—	—	—
1952	11,654	4,645	3,234	1,921	598	620	606

* Probably contains some duplication.

TABLE II

Exports of Copra from the Trust Territory of the Pacific Islands

Fiscal Year.	*Value.*	*Dollar Equivalent.*	*Rate of Exchange.*
1917	Y 574,216	$ 294,745	Y = $ .5133
1918	876,844	466,569	.5321
1919	795,261	407,015	.5178
1920	582,999	293,657	.5037
1921	555,938	268,240	.4825
1922	562,495	268,873	.4780
1923	767,333	372,770	.4858
1924	1,037,354	472,286	.4119
1925	1,677,354	688,386	.4104
1927	1,792,264	849,712	.4741
1928	1,964,576	911,760	.4641
1929	1,854,339	854,850	.4610
1930	1,709,395	844,270	.4939
1931	1,126,783	550,433	.4885
1932	1,173,258	329,803	.2811
1935	1,745,000	500,990	.2871
1937*	3,041,208	875,865	.288
1948**	$ 739,964	739,964	—
1949**	747,428	747,428	—
1950**	782,043	782,043	—
1951**	1,269,462	1,269,462	—
1952**	1,249,455	1,249,455	—

* Contains some re-exports.
** Dollar value represents price paid to producer.

TABLE III

Areas of Palm Forests during the Japanese Period

Branch Bureau.	*Area in Hectares.* (1 hectare equals 2.47 acres) *1923.*	*1938.*
Saipan	3,581	2,794
Palau	748	1,974
Yap	2,721	3,087
Truk	3,362	4,238
Ponape	4,767	7,583
Jeluit (Marshalls)	10,382	12,106
Total	25,558	32,052

The Rising of the Palolo

A reliable astronomical formula for predicting the rising of the Palolo

By C. G. R. McKAY*

IN Western Samoa, outlying islands of the Fiji group, and other islands of the Pacific, the annual appearance of the *palolo* is almost a festival, occasioned both by its rarity and its succulence as a food.

The *palolo,* mistakenly called a worm, is the released stream of spawn of a sea anelid, *eunice viridis,* resembling a diminutive lobster, which spends its entire life hiding in some crevice or orifice in the coral deep below the surface. It releases once annually its soft hind portion, while head and body remain immovable and another propagation portion grows. The section released is somewhat after the nature of jelly-fish spawn, as many as 300 segments adhering to each other lineally to form a wriggling "worm," and of any length up to 300 millimetres. The male "worms" are reddish-brown, and those of the female are blue-green. Upon contact with the surface and the light of dawn the sacks enclosing them dissolve, and fresh life begins. But when?

During the wartime occupation of Western Samoa by the United States Marine Corps a strict black-out was required, and night fishing was prohibited entirely. Towards the end of 1942 the crisis had eased a little. The people approached the American commanding officer for permission to go out for *palolo* before dawn on the one night only of its appearance. He was inclined to agree, but in the forthright way of military men, required to know which night it would be "and no fooling."

Various authorities (notably Dr. Augustin Krämer, in his *Die Samoa Inseln*—Stuttgart, 1902) have described this phenomenon, but none had given an accurate formula for forecasting its appearance. The Samoan formula was to count full moon (*malupeaūa*) as the first night when the moon rises after sunset, and to expect *palolo* on the seventh morning after the full moon nearest to the end of October. But no one was quite sure, or could explain the connection between the *palolo* and any particular date.

After much questioning and analysis of the answers a formula was hit upon which was found reliable in practice and reasonable in theory: that the *palolo* would rise on the seventh morning after the full moon, being that last quarter of the moon nearest to the day when the sun would pass over the zenith on its way southward. If the day of maximum sun's altitude is spaced more or less equally between two last quarters of the moon, the *palolo* will appear some at each last quarter, or if the last quarter should fall due by exact calculation, say, in the afternoon, then the *palolo* may appear both in the morning of that day and of the day following.

In test by practice this formula proved accurate. Now for the theory: It is that the parent anelid, deep down in the coral, requires a combination of light and minimum water pressure to activate its reproductive processes. The sun at its zenith pours maximum light down into the depths. The activation thus caused is stimulated at dawn of each day, and reaches its crisis on the dawn of the last quarter of the moon, for low tides and correspondingly low pressures synchronize at dawn with the last quarter of the moon in those Pacific islands where the *palolo* appears.

* Mr. McKay was formerly Secretary of the Department of Island Territories, Government of New Zealand.

Teaching Materials Produced in the Trust Territory of the Pacific Islands

By J. L. TAYLOR, Department of Education

FIRM in the belief that children learn more easily and satisfactorily from properly-oriented reading materials, the Trust Territory of the Pacific Islands Department of Education has, over the past eight years, produced a wide variety of small booklets for school use.

The Micronesian Reader Series: *Island Play, Two Island Boys, An Island Family,* and *Three Children* are elementary readers. Written by trained textbook writers and appropriately illustrated with island scenes, they portray life as an islander sees and knows it. Two of them have been translated into several Micronesian languages.

Better to acquaint intermediate school pupils with their geographic environment, a number of social science, nature study, and agricultural readers were prepared. They include: *A Geography of the Marianas, A History of the Marianas, A Geography of Truk, How Yap Was Formed, The Giant African Snail, The Breadfruit Tree, The Banana Plant, Taro: A Staple Food of Micronesia, The Coconut: Micronesia's Most Valuable Tree.* Some of these booklets have been reproduced in several island languages.

More than merely providing information, these mimeographed pamphlets furnish materials for understanding the use and conservation of natural and human resources. They encourage an appreciation of the Micronesian environment, and, finally, they are excellent media for developing reading skill in both English and island languages.

Two commercially-printed and bound volumes entitled *Legends of Micronesia* record tales retold by the elders on many islands of Micronesia. Educational personnel in each of the six districts have, likewise, prepared in both English and island languages local legends that would otherwise become lost. These legends are frequently made a part of integrated core programmes prepared to study local community problems.

In addition, a good start has been made in unravelling the complex and confusing linguistic patterns present in the Trust Territory. Phonetic systems, vocabularies, dictionaries, grammars, and study helps for eight of the languages are being written.

Although specifically for use in the schools of Micronesia, the information and suggestions for its use apply to other Pacific islands. The Department will be happy to furnish complimentary copies of these materials and to receive, in exchange, similar teaching aids produced in other Pacific areas.

SOCIAL DEVELOPMENT SECTION
Quarterly Reading List — No. 8

As in the previous Quarterly Reading List, an attempt has been made in this current list to note every item to appear in the field, whether examined or not; bibliographies, publishers' notices, reports and so on being used as additional sources for entries.

While it is clearly impossible to check for errors which may occur in these (e.g., in the classification used in the original sources or in the entries themselves), it is felt that this danger is outweighed by the almost complete coverage given by the new method of compilation. Unsighted items are, however, indicated by an asterisk at the end of the entry.

The Executive Officer for Social Development, Box 5254, G.P.O., Sydney, will be glad to obtain for any metropolitan or territorial Government copies of any items listed, even though the original material may not be available in Sydney.

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SOUTH PACIFIC COMMISSION

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South Pacific Conference

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SECOND SOUTH PACIFIC CONFERENCE

Editorial In London "Times"

THE following editorial on the Second South Pacific Conference, held at Commission headquarters from 15th to 27th April, appeared in *The Times*, London, for Saturday, 18th April, 1953:

SOUTH PACIFIC

From South Pacific islands scattered across thirteen million square miles of blue sea the fifty delegates attending the second South Pacific Conference have gathered in the capital of New Caledonia. The summer is nearly over in Noumea, the flame-coloured blossom on the trees outside the cream and green offices of the South Pacific Commission has fallen, the wind has veered from the hot north. In this soft setting the representatives of eighteen non-self-governing territories from as far afield as the Marianas in the north, Tahiti in the east, and New Guinea in the west are met under the chairmanship of M. LASSALLE-SERE, senior French member of the Commission, to continue the spirited discussions begun in Fiji in 1950. Whereas the Commission, now nearing its fifth birthday, represents the six Governments administering the South Pacific (Australia, France, the Netherlands, New Zealand, the United Kingdom, and the United States), the Conference represents the peoples of the islands. To-day these spokesmen of the far scattered Polynesian, Melanesian, and Micronesian races have the opportunity and the duty to exchange counsel.

There is something to stir the European's emotions in this Conference, without parallel in pre-war years, and in the eagerness with which island chieftains, teachers, hospital workers, and agricultural assistants have made the long journey by canoe, steamer, and aeroplane to play their part. Their peoples were not always easily recognized as "God's best, God's sweetest work" by generations earlier than those of R. L. STEVENSON and RUPERT BROOKE. The islands were far from being a human Paradise before Europe first trespassed beyond the Magellan strait and headed west in the early sixteenth century to Guam and the Philippines. Many of the noble savages needed no instruction in savagery. Yet the ugliness that followed, when western civilization penetrated the barrier reefs into the calm lagoons, and matched its special experience against the islanders' special innocence, seems to-day peculiarly hateful.

The first great navigators from Europe were not the culprits. They arrived by accident, searching for the passage to the east and the unknown southern continent. MAGELLAN, TASMAN, and DRAKE sought no fresh territories here for their Sovereigns, but wanted only pigs, fowls, and fruit for their sailors, though the Spaniards, more ambitious than the Portuguese, Dutch and English, did turn colonizers, and their efforts in the sixteenth and seventeenth centuries left an ugly scar. In the age of rediscovery in the late seventeenth and eighteenth centuries CAPTAIN JAMES COOK alone seems to have conferred benefits on the native inhabitants. But it was not until the great captains returned—if they did return—that they committed, in innocence, the cruellest error. They gave to the Old World the news of a second El Dorado of wealth uncountable and beauty unsurpassed. Now there were maps and navigators as well as dreams to draw the worst as well as the bravest adventurers of the nineteenth century to Polynesia and beyond. As SIR HARRY LUKE and others have so vividly described, "the scum of white humanity on both sides of the Pacific and both halves of the American continent," descended on Elysium.

The traders who had only sought to exchange beads, iron tools, and muskets for passion fruit, oranges, and sweet potatoes were caught in the evil torrent. The missionaries saw their work undone. Laughter and innocence had disappeared, as the profiteers descended on the South Pacific to rape its sandal wood and pearls, set up their sea-slug industries, kidnap the local labour, and leave behind a legacy of disease, poverty, and demoralization. The "blackbirders" who went ashore disguised in surplices returned home rich with their cargoes of slaves; the missionaries remained, with empty chapels and their lives in danger. The wonder is less that the west had succumbed to its temptations than that the past hundred years have seen a return to sanity, effective government, and successful evangelism in the dependencies. If colonial rule was imposed, it was frequently at the wish of the islanders themselves. The age of recovery has been possible only because the native leaders never wholly lost their faith in "civilized" man.

The South Pacific Commission exists solely in order to promote the well-being of these territories. Under its British Secretary-General, SIR BRIAN FREESTON, it handles social, health, and economic matters; political and strategic questions are not its business. For well under £200,000 a year, subscribed by the six nations, it affords a new medium for instigating research for the area as a whole and associating the three million scattered islanders with each other and their common needs. The present Conference is particularly concerned with the improvement of agriculture, the study of fishery methods, and a review of cash crops. Experiments already in progress will be reviewed and lessons pooled. In the medical field experts will report on research into epidemics and quarantine, infant welfare, tuberculosis, and nutrition. The educationists will be cross-examined about a wide variety of important pilot projects launched since 1950.

Much of this is no more than an extension of work which has long been done by, for example, the British Colonial Office. The islander who cuts copra in the Gilbert and Ellice Islands looks for no quick benefits from pilot schemes in French or Dutch territories a thousand miles away. But by degrees some seeds the Commission has planted will bear fruit, and it is essential that the beneficiaries should feel some close link with their cultivation. The little international Parliament in session in Noumea represents a big stride forward along the road of twentieth-century progress.

Deposit Notice No. 32

Miller, J. G.: *Report of the second students' trek into inland Santo (New Hebrides)*, Monday, 20th September, 1948, to Monday, 27th September, 1948. 38 p. *Ts.* 2/6 (Australian currency).

Deposit Notice No. 33

Miller, J. G.: *Report on the island of Epi for the Presbyterian Mission Synod.* Vila, New Hebrides, 1946. 8 p. *Ts.* 3d. (Australian currency).

The following manuscript has been made available for deposit and reproduction by kind permission of Mr. H. E. Maude, of Wahroonga, N.S.W.:—

Deposit Notice No. 33

Kaysser, C.: *A Nauruan Grammar*, 1937. 223 p. *Processed.* 12/- (Australian currency).

The following manuscript has been made available for deposit and reproduction by kind permission of Mr. J. R. Halligan, Senior Commissioner for Australia to the South Pacific Commission:—

Deposit Notice No. 35

An English-Nauru dictionary. 44 p. *Processed.* 3/- (Australian currency).

Microfilm positives of any of the above documents may be obtained at the costs stated in each notice, on application to the Executive Officer for Social Development, South Pacific Commission, Box 5254, G.P.O., Sydney.

Pacific Populations Study For Australian National University

STATISTICS relating to Pacific island populations are being collected during a six months' tour of territories by Dr. Norma R. McArthur, who holds a research fellowship in demography at the Australian National University, Canberra. Dr. McArthur arrived in Noumea early in July. She is using Commission headquarters as a base for her investigations relating to New Caledonia.

The recent South Pacific Conference of island peoples held at Noumea recommended that the Commission should provide expert assistance to enable territories to assess their own population trends. This the Commission is doing by collaborating with the Australian National University in facilitating Dr. McArthur's studies.

There are territories in the Commission area such as Western Samoa, where populations are increasing rapidly, and where food production potential is limited. In others such as New Guinea, where people are needed for development, populations are almost static. In still others, population pressures have resulted in emigration. In all cases, demographic information is necessary to reveal the basic factors involved in population changes, in order that future trends may be anticipated and policy shaped accordingly.

Dr. McArthur considers that the most serious gap in present knowledge of Pacific populations is the lack of information on their age-structure, since all the changes which are likely to occur in the total numbers ultimately depend on this. "If there are few women of reproductive age in a population, there will of necessity be few births; similarly, if a large proportion of the population is in the higher age groups, then we would expect a fairly large number of deaths each year," Dr. McArthur explained. "In general, information of this kind, which is necessary for any detailed demographic analysis, is not given in the official publications of the various territories, and the object of this field trip is to try to collect any relevant material which may be available in the islands themselves."

Dr. McArthur returned to Australia last year after five years' study in Europe to take up her research fellowship in demography at the National University. While abroad she spent six months in Rome, where she carried out a research project for the University College, London, on the genetics of twinning. "Rome was selected," she explained, "because more Italian women have more children later in life than the women of most other European countries, and the incidence of twins is consequently higher."

While in New Caledonia, Dr. McArthur will make a brief visit to the New Hebrides. Early in August she will leave for Suva to continue her investigations there.

Commission Work Programme

THE purpose of the South Pacific Commission is to assist member Governments in promoting the welfare of Pacific island peoples. To this end its main activities are centred around a work programme that was first defined in 1949 at a meeting of the Commission's expert advisory body, the Research Council. This body meets annually to review progress made with the work programme and, where necessary, to expand or redirect it.*

At present the programme includes over 40 projects relating to economic development, health and social development in South Pacific territories. Principal fields of activity under these heads are:

Economic Development: The improvement of cash crops (mainly copra, cocoa, and coffee); the introduction to the region of suitable plants of economic importance; control of pests, diseases and weeds; industrial development of the area; fisheries; land-use and economic surveys; improvement of food production and utilization.

Health: Nutrition of infants and adults; surveys and research relating to filariasis and elephantiasis, malaria, leprosy and tuberculosis; studies in ophthalmology.

Social Development: Community development schemes; welfare centres; co-operatives; vocational training of island peoples; housing, linguistics; literature for island peoples.

Significant developments relating to the work programme are reported regularly in the *Quarterly Bulletin*.

* See "South Pacific Commission," para. 4, inside front cover.

Population Study of the Marind-Anim

In December of 1952 a field project was commenced among the Marind-Anim people of Netherlands New Guinea, under Commission sponsorship, in an attempt to trace the medical and social causes of continued depopulation among the people, and to suggest the methods required for further investigations of this problem in other Pacific territories.

Dr. S. Kooijman, of the Leiden Museum, began work on the project at the end of 1952, in consultation with Dr. H. J. T. Bijlmer, Director of Health of Netherlands New Guinea, and assisted by medical field staff. As a socio-anthropologist, Dr. Kooijman's first investigations in the Western part of the area concerned the food situation of the people, the size and composition of families and the marriage system.

In April of this year the main team was completed by the arrival of Father J. Verschueren of the Roman Catholic Mission at Merauke, whose services have kindly been made available for the project by the Vicar Apostolic at Merauke. Father Verschueren's extensive knowledge of the country and the people, and his ethnographic work in the district, will enable him to make an especially valuable contribution to the collection and analysis of statistical data.

Nutritionist Included

A further addition to the team, not at first contemplated but found in the course of the work to be necessary, is a nutritionist. The Netherlands New Guinea Government has been fortunate in securing for this position the services of Dr. C. Luyken, who served for several years in a nutrition team in Indonesia and is at present assistant to the well-known nutritionist, Professor B. C. P. Jansen at Amsterdam. Dr. Luyken is expected to arrive in New Guinea in July.

In view of the complexity of the problem on which the team is working, and the necessity to extend the area covered by the project for comparative purposes, the field work will now continue until the end of 1953, and possibly into 1954.

Technical Publications In Social Development

THE Commission's Executive Officer for Social Development maintains a small stock of technical publications which will be sent on request to specialist officers working in Pacific territories. Requests should be addressed to the Executive Officer at Box 5254, G.P.O., Sydney.

This service regularly includes such periodicals as *Community Development Bulletin, Fundamental Education — A Quarterly Bulletin, South Pacific* and *Pacific Islands Education.* Individual documents of special interest have heretofore been listed in this journal under the "Circulation of Technical Publications" section of the Social Development Work Programme, and the list is now to be continued under the new title above.

Available publications received during the past three months are:—

No. 116. *A Short Study of Reading Problems in the Pacific Islands,* by R. S. Adam. Suva. Government Printer, 1953. (Educational Research Institute for Fiji and Western Pacific Territories, FIER 1.)

No. 117. *The Relationship between Age and Reading Attainment in Fiji Schools,* by R. S. Adam. Suva, Government Printer, 1953. (Educational Research Institute for Fiji and Western Pacific Territories, FIER 2.)

No. 118. *Research Survey for 1952,* Educational Research Institute for Fiji and Western Pacific Territories. Suva, Government Printer, 1953. (FIER 4.)

No. 119. *Reading and Arithmetic Tests for Classes II to VIII.* Educational Research Institute, Fiji.

No. 120. *African Education:* A Study of Educational Policy and Practice in British Tropical Africa. Oxford, 1953. Produced on behalf of the Nuffield Foundation and the Colonial Office.

No. 121. *Rural Education: Basis for the Development of Rural Education.* Port Moresby, Department of Education, May, 1953. *Mimeograph.*

No. 122. *Papua and New Guinea — Education Ordinance, 1952.* Port Moresby, Government Printer, 1953.

No. 123. *Bamboo as a Building Material.* Washington, United States Department of Agriculture (Foreign Agricultural Service). May, 1953.

No. 124. *A Guide for Primary Produce — Marketing Co-operative Societies.* Prepared by the Department of Co-operative Development, Tanganyika, 1951.

No. 125. *Notes on Some Agricultural Development Schemes in Africa and Aden.* First revision. London, Colonial Office, April, 1953. *Mimeograph.*

No. 126. *Community Development in Uganda.* Despatch No. 490/52 of the Governor of Uganda to the Secretary of State for the Colonies. Uganda, July, 1952.

No. 127. *Social Progress through Local Action.* New York, United Nations, 1953. (Study Kit No. 1.) The kit, the first to be produced in the U.N. Series of Publications on Community Organization and Development, is designed to supply readers with information on self-help activities carried on by local communities in various parts of the world. It consists of reprints of a number of books and articles in this field, including:
Common Ground in Community Development Experiments, by Margaret Read.
Area Education Centres in Papua and New Guinea. Department of Education of Papua and New Guinea.
Rural Reconstruction in Mexico, by S. Hatch.
Social Services in the Belgian Congo, by J. van Hove.
A Sample List of Community Welfare Centres (with bibliography. United Nations.

There are no posters, filmstrips or similar visual materials in the kit, which is primarily designed for study by community leaders.

Three of these kits have kindly been supplied to the Commission by the U.N. Social Welfare Division, and are available for loan to the territories.

Improving Pacific Food Resources

The Commission is studying ways and means of improving the production and utilization of subsistence foods in the South Pacific. Last April it appointed M. Jacques Barrau as technical officer for three years to work on this project.

M. Barrau, who was formerly Director of Agriculture in New Caledonia, will concentrate on subsistence crops. Furthermore, he will assemble information on existing methods of preserving and processing foods. As there is a close relation between village agriculture and food production, the total pattern of agricultural production will have to be taken into account.

Cattle Breeders Show Interest in Santa Gertrudis

Cattle breeders in New Caledonia have shown keen interest in the articles that appeared in the Commission's *Quarterly Bulletin* for April last relating to Santa Gertrudis cattle, a new breed specially developed for tropical conditions at the King Ranch, Texas, by the crossing of European and Indian species. The importation of sires to improve New Caledonian herds is under consideration.

In Fiji also, the early importation of Santa Gertrudis stock for a local grading-up scheme is contemplated.

The improvement of stock and pastures in South Pacific territories forms an important project in the Commission's work programme for economic development in the area.

Pacific Islands Industry

Experienced officers of the Division of Industrial Development in the Australian Department of National Development will assist the South Pacific Commission to study the present structure and condition of industry in representative Pacific islands. The officers concerned are Mr. N. G. Crowley, B.Com., an Assistant Director in the Division of Industrial Development, who will be in charge of the study, and Mr. K. H. Danks, B.Sc., B.Com., Project Officer.

Published information about island industries has been examined at the headquarters of the Division in Melbourne. Field work will begin in August when Mr. Danks will visit Port Moresby and Rabaul to complete his statement on industries in Papua and New Guinea. Arrangements are being made for subsequent visits to other island territories.

This investigation is the first field stage in carrying out the Commission's decision to survey current and projected industrial development in the Pacific island territories. Preliminary enquiries have been under way for some time under the direction of Dr. C. S. Belshaw, Research Fellow at the Research School of Pacific Studies, of the Australian National University, Canberra. Dr. Belshaw is making a survey of the recorded handcraft skills of potential commercial value in the Pacific islands, and an analysis of the recorded experience of industrialization in tropical dependencies outside the Pacific.

Commission to Hold Twelfth Session in October

The Twelfth Session of the South Pacific Commission will open at headquarters in Noumea on or about 12th October. It will last approximately fifteen days.

The Commission will consider the recommendations regarding its work programme made by the Research Council at its fifth annual meeting last June. These relate mainly to the projects on which the Commission is engaged in the fields of economic development, health and social development. In framing them, the Research Council gave full consideration to the resolutions passed by the Second South Pacific Conference in April, recommending Commission action in fields including economic development of the area, the relation of population to resources, marketing, health, diet, the role of women and women's organizations in the community, and education.

The Commission's budget for 1953 will also be considered at the Twelfth Session.

Rehabilitation of the Leper

(Continued from page 6)

accorded her by the community; I do not think it would have been any warmer in the case of a former leper.

Conclusions

It is essential that education should keep pace with rehabilitation. Lepers restored to the community should be made enthusiastic propagandists for present methods of treatment, and living examples of the effectiveness of leprosy control. Everywhere, in their own homes and in society, they should be living witnesses to the results that are possible.

In this way, the belief will gradually disappear that the leper is condemned to everlasting segregation and is lost to his family and to society. Society, by making this further effort, will justify the measures it imposes temporarily on lepers, and will enable leprosy control to become fully effective.

We may paraphrase, for leprosy, what Dr. R. Even wrote on tuberculosis:

> After-care, on leaving the sanatorium, is the main problem; it is good to recognize a leper, still better to cure him, but to restore him to family and social life is everything.

South Pacific Literature Bureau

During the quarter, work continued on a number of manuscripts referred to in the April edition of the *Quarterly Bulletin*. Manuscripts included a Motu Reader for New Guinea; *Mothercraft in Melanesia;* a Fijian translation of *Debts Make Difficulties; Children of the Islands;* for New Guinea; *The Bread Fruit Tree and Its Uses* for the Trust Territory; and a number of leaflets on coconuts and copra for the area as a whole. Readers will appreciate that the preliminary stage of getting a manuscript into publishable form, and looking into questions about format, price, illustrations and so on, is perhaps the slowest part of publishing; also it is little use publishing a book until one is sure a reasonable number of people want to use it; it takes time finding this out. Some fifty or sixty manuscripts are at present in various stages of this exploratory phase, and it is hoped a good percentage will eventually appear in print.

As usual, the Bureau received many enquiries during the quarter for informative books available on particular subjects, copies for inspection, posters, and so on. Perhaps the most interesting was a request from the British Phosphate Commission, that the Bureau should select on their behalf two small libraries of simple books, one for Ocean Island and one for Nauru.

Technical Assistance Problems

Technical assistance experts and missions in the field frequently come up against "baffling social and cultural problems" which affect the application of their techniques. The solution of these problems may sometimes lie in changing the techniques to fit social and cultural patterns to which they have not previously been applied. Alternatively, the onus may lie with the traditional social and cultural structures of the countries concerned to adapt themselves sufficiently to benefit from technical change.

These points were made by Mr. Walter H. C. Laves, formerly Deputy Director-General of U.N.E.S.C.O., in outlining the scope of a conference of experts held at U.N. Headquarters in April to examine the social questions that bear upon economic advance.

Pacific Reading

Pacific Reading is a quarterly periodical issued by the South Pacific Commission Literature Bureau. Through it, the Bureau hopes to keep all who are interested in the provision of literature and visual aids for the peoples of the South Pacific posted regarding latest material, whether written specially for the Pacific or for other comparable areas.

The content of each issue of the paper is as follows:—

Notes and News. This section records information received from the Pacific area about work being done there in the preparation, distribution and use of new literature and visual aids.

Articles. The leading article in each issue will take a selected subject and will review the available material on the subject. Some of these articles will deal with literature and some will deal with visual aids. Other articles will deal with subjects of general interest falling within the scope of the Literature Bureau.

Book List and Visual Aids. The Book List in each issue will consist of reviews of appropriate books, while the Visual Aids section will review films, filmstrips, posters, maps, etc.

Pacific Reading is published in March, June, September and December, No. 1 having appeared in December, 1952, and the current issue, No. 3, in June, 1953. Regular subscriptions are: single copy, stg. 2/-; annual subscription, stg. 6/-; annual subscription for ten or more subscriptions sent to the same address, stg. 5/-.

Subscriptions may be sent either to the Secretary-General in Noumea, or to the Executive Officer for Social Development, Box 5254, G.P.O., Sydney, N.S.W., Australia. There is an English edition and a French edition.

Anthropology In Oceania

(Continued from page 32)

progress, Governments require advice about straightforward and economical methods of obtaining the social information they need, and many of the Commission's projects would be the better for sociological appraisal. It is my belief that if the Commission ever does make such an appointment, the demand for the services will be much greater than the supply.

Factors Affecting the Rooting of Cacao Cuttings

HOMERO CASTRO, agronomist from Ecuador, has presented to the faculty of the Cacao Centre of the Inter-American Institute of Agricultural Sciences, a thesis under the title, "Algunos estudios sobre el arraigamiento de estacas de cacao." This thesis was one of the prerequisites to obtain the diploma of "Especialista en Cacao." The objective of Mr. Castro's project was to determine some of the factors that affect rooting of cacao cuttings, while at the same time to develop an economical small propagator with automatic control of humidity.

Taking up first the study of root-promoting hormones, it was found that best results were realized with indolebutyric acid applied by the quick-dip method, using a concentration of 8,000 ppm in 60% alcohol. The commercial powder, Merck's "Hormodin No. 2," which is most commonly used in propagation centres in Costa Rica, gave results inferior in all cases to alcoholic solutions of indolebutyric acid in concentrations varying from 2,000 to 10,000 ppm. The cuttings treated with indolebutyric acid at 8,000 ppm produced 100% more roots than those treated with Hormodin and the average length of roots produced was 5 to 10 times greater. The difference in percentage of cuttings rooted, however, was not significant.

In comparisons of types of cutting material to be used, the best rooting was obtained with cuttings from twigs in full flush (the flush itself removed before the cutting was placed in the propagator). This superiority was, however, dependent on use of indolebutyric acid, since the cuttings in flush gave the poorest results of all when not treated with hormones. This result would indicate that the principal limiting factor in rooting of cuttings with new flushes is the deficiency of hormone.

Simple Propagator Developed

A simple, inexpensive propagator was developed, with an automatic control of relative humidity inside the propagator. The method used was originally adapted to the rustic, wooden "Turrialba" propagator, and it was found possible to maintain very nearly 100% humidity without watering the cuttings more often than once every three days at most. The technique consists in the use of cloth covers (unbleached muslin or coarse weave jute) on the propagator covers with continuous moistening of these covers through capillarity.

A constant water level is maintained in a trough above the propagator by means of a float valve. Water is conducted from this trough to the cloth covers by pieces of cloth or heavy paper laid from the trough to the cover. The slope of the cover can be adjusted to maintain all parts of it continuously wet, thus supplying a surface for very rapid evaporation to compensate for any variation in humidity due to changes in internal temperature. About 50% additional shade is found necessary if muslin covers are used.

More recent experiments with this propagator have shown that the cloth should be saturated with Bordeaux mixture and allowed to dry before using to prevent rotting. Also, brass nails should be used to fasten the cloth to the frames to avoid rusting.

—From *"Cacao,"* Oct.-Dec., 1952.

PRINCIPAL COMMISSION PUBLICATIONS

THE documents listed below are published by the South Pacific Commission, and are available at the price of stg. 2/- per copy post free by surface mail. If required by airmail, extra postage will be charged.

Agreement Establishing the South Pacific Commission.

Proceedings of Sessions of the South Pacific Commission (First to Eleventh).

Annual Report of the South Pacific Commission (1948 to 1952 inclusive).

South Pacific Commission Work Programme: Summary of Projects Approved in 1949. (Issued as Supplement to Annual Report for 1949.)

Reports of Meetings of the Research Council (Third and Fourth).
(Reports of First and Second Meetings of the Research Council appear in the Proceedings of the Third and Sixth Sessions respectively.)

Report of First South Pacific Conference.

Progress Report on Action Taken on the Resolutions of the First South Pacific Conference.

Quarterly Bulletin ..... From Vol. 1, No. 1, January, 1951, to Vol. 3, No. 3, July, 1953, inclusive.

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NOTE: All Commission publications are available from the South Pacific Commission, Noumea, New Caledonia, or from the Commission's branch office at Sydney (postal address: Box 5254 G.P.O., Sydney, New South Wales, Australia).

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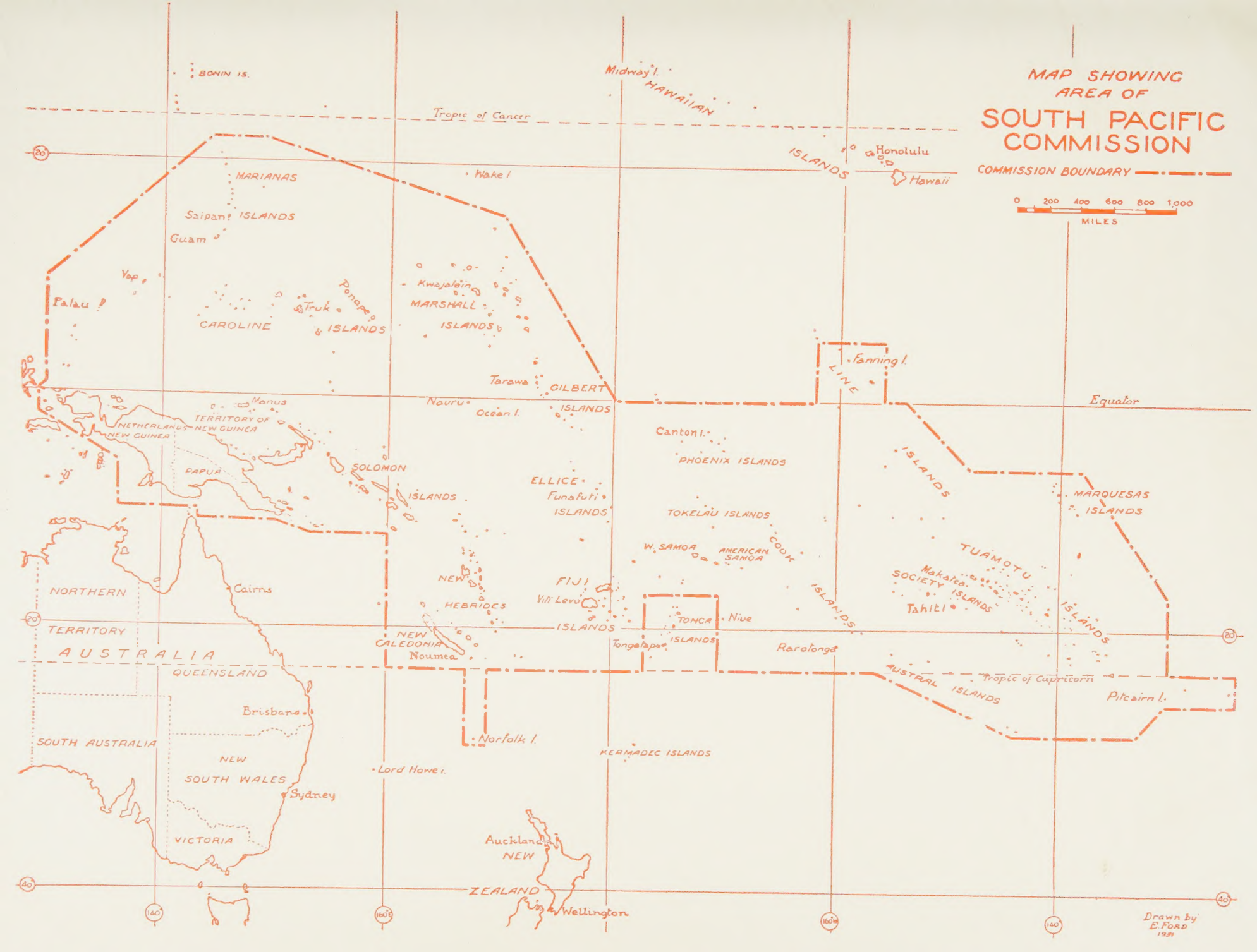
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South Pacific Commission Technical Papers

THE following Technical Papers are available from the South Pacific Commission. The series includes selected project reports and papers previously given restricted distribution as Supplements to Progress Reports.

Copies of all papers listed may be procured from the South Pacific Commission, Noumea, New Caledonia, or from the South Pacific Commission, G.P.O. Box 5254, Sydney, Australia. Except where otherwise stated, price per copy is 2/- stg., post free by surface mail.

1. **The Co-operative Movement in the Gilbert and Ellice Islands.**

2. **Community Development.** March, 1950. 27 pp., bibliography. By H. E. Maude. February, 1949. 31 pp.

3. **The Village Library.** April, 1950. 9 pp., book list.

4. **Visual Aids in Education in the South Pacific.** By A. L. Moore, Visual Aids Consultant, Commonwealth Office of Education. April, 1950. 58 pp.

5. **Fisheries and Animal Health Research Projects of Significance for the South Pacific Region,** conducted under the authority of the Commonwealth Scientific and Industrial Research Organization, Australia. May, 1950. 9 pp.

6. **A Preliminary List of Economic Plants of New Caledonia.** By J. Barrau, Director of Agriculture, New Caledonia. July, 1950. 10 pp.

7. **A Preliminary List of Plants Introduced into Tahiti.** July, 1950. 21 pp.

8. **Insect Pests in the Wallis Islands and Futuna.** Extract from a report by F. Cohic, Entomologist, Institut Francais d'Oceanie. December, 1950. 30 pp.

9. **Report of Plant and Animal Quarantine Conference, Suva.** April, 1951. 24 pp., two annexures.

10. **Bibliography of Co-operation in the South Pacific.** April, 1951. 10 pp.

11. **Interim Reports on the Moturiki (Fiji) Community Development Project.** By Howard Hayden, Director of Education, Fiji. May, 1951. 48 pp.

12. **Tuberculosis Investigations by the South Pacific Commission in 1950.** May, 1951. 124 pp.

13. **Vocational Training Facilities in Australia for Students from South Pacific Territories.** May, 1951. 8 pp.

14. **Educational Broadcasts to Samoan Village Schools.** Department of Education, Western Samoa. May, 1951. 7 pp.

15. **Libraries for Beginners.** By Dr. & Mrs. Kenneth Todd, Kwato Mission, Eastern Papua. July, 1951. 21 pp.

16. **Some Notes and Suggestions Regarding Conservation of Important Archaeological Sites and Archives in South Pacific Territories.** By F. M. Keesing. August, 1951. 19 pp., bibliography. (Price 5/- stg.)

17. **Conference of Experts on Filariasis and Elephantiasis, Tahiti: Summary of Proceedings.** September, 1951. 22 pp.

18. **Report on Nutrition Investigations by the South Pacific Commission in 1950.** November, 1951. 77 pp., tables, graphs.

19. **Report on Copra Grading.** November, 1951. 20 pp.

20. **Research Workers in the South Pacific.** December, 1951. 15 pp.

21. **Note on the Mycoflora of Rice Seed in the Territories of the South Pacific.** By Dr. F. Bugnicourt, Director, Institut Francais d'Oceanie. January, 1952. 5 pp., appendices, bibliography.

22. **The Chemical Composition of the Milk of New Hebridean Mothers.** By F. E. Peters, biochemist, South Pacific Commission. February, 1952. 7 pp.

23. **Nutrition Research Conducted in New Hebrides during 1951.** By Sheila Malcolm, nutritionist, South Pacific Commission. April, 1952. 51 pp., tables, graphs.

24. **A Survey of Leprosy on the Island of Nauru.** By Dr. C. J. Austin, Director, Makogai Leprosy Hospital, Fiji. April, 1952. 8 pp., table, graph, map.

25. **Report of Fisheries Conference, Noumea.** May, 1952. 46 pp., appendices.

26. **Further Education in the Cook Islands.** By P. F. Henderson, Officer for Further Education, Cook Islands. July, 1952. 13 pp.

27. **A Survey of Leprosy in the British Solomon Islands Protectorate.** By Dr. C. J. Austin, Director, Makogai Leprosy Hospital, Fiji. July, 1952. 12 pp., map.

28. **Coral as a Building Material.** July, 1952. 10 pp., bibliography.

29. **Current Research in the South Pacific in the Field of Economic Development.** July, 1952. 82 pp., map.

30. **Bibliography of Cargo Cults and other Nativistic Movements in the South Pacific.** By Ida Leeson, former Mitchell Librarian. July, 1952. 16 pp., map.

31. **Cocoa Plantation Management in Western Samoa.** By D. R. A. Eden, General Manager, New Zealand Reparation Estates, and W. L. Edwards, Assistant General Manager. October, 1952. 20 pp., diagrams.

32. **Types of Organization in Adult and Mass Literacy Work.** By D. B. Roberts, Organizer of Island Literature, South Pacific Commission. August, 1952. 10 pp.

33. **A Survey of Malaria in the British Solomon Islands Protectorate.** By Dr. R. H. Black, School of Public Health and Tropical Medicine, University of Sydney. November, 1952. 38 pp., appendices.

34. **Rhinoceros Beetle Control in the Kingdom of Tonga.** By L. J. Dumbleton, Plant and Animal Quarantine Officer, South Pacific Commission. November, 1952. 7 pp.

35. **The Purari Delta—Background and Progress of Community Development.** November, 1952. 37 pp.

36. **Cocoa Growing in Fiji Islands.** By D. H. Urquhart, former Director of Agriculture, Gold Coast. December, 1952. 20 pp., map, appendices.

37. **Cocoa Growing in Netherlands New Guinea.** By D. H. Urquhart, former Director of Agriculture, Gold Coast. January, 1953. 14 pp., maps, appendix.

38. **Coffee Growing in New Caledonia.** By D. H. Urquhart, former Director of Agriculture, Gold Coast. January, 1953. 27 pp., maps, appendix.

39. **Cocoa Growing in Western Samoa.** By D. H. Urquhart, former Director of Agriculture, Gold Coast. January, 1953. 22 pp., maps, appendices.

40. **Cocoa Growing in New Hebrides.** By D. H. Urquhart, former Director of Agriculture, Gold Coast. January, 1953. 30 pp., appendices, map.

41. **Social Problems of Non-Maori Polynesians in New Zealand.** By Rev. R. L. Challis, Pastor of the Pacific Islanders' Congregational Church in New Zealand. February, 1953. 15 pp., bibliography.

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43. **Research in Queensland in Tropical Plant and Animal Industries.** By Jacques Barrau, Technical Officer, South Pacific Commission. May, 1953. 70 pp., illus., maps, appendices.

44. **The Use of the Vernacular in Teaching in the South Pacific.** By G. J. Platten, Education Officer, Papua and New Guinea. June, 1953. 34 pp., appendices.

45. **The Nimboran Community Development Project.** By Dr. J. van Baal, Director of the Bureau of Native Affairs, Netherlands New Guinea. June, 1953. 42 pp., map, chart, appendices.